general_ledger

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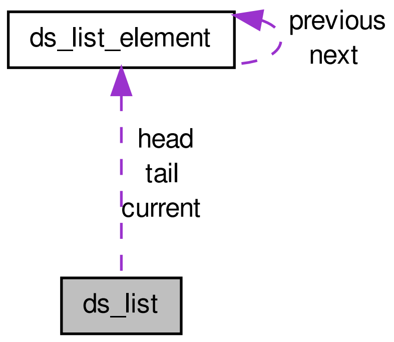
Data Structure Documentation

3.1 ds_list Struct Reference

Collaboration diagram for ds_list:



Data Fields

- size_t length
- bool free_on_delete
- struct ds_list_element ∗ head
- struct ds_list_element ∗ tail
- struct ds_list_element ∗ current
- void(∗ data_destructor)(void ∗)

3.1.1 Detailed Description

List data structure

3.1.2 Field Documentation

3.1.2.1 struct **ds_list_element**∗ ds_list::current

Pointer to current element

3.1.2.2 void(∗ ds_list::data_destructor)(void ∗)

Data destructor function

3.1.2.3 bool ds_list::free_on_delete

’Free on delete’ flag

3.1.2.4 struct **ds_list_element**∗ ds_list::head

Pointer to head element

3.1.2.5 size_t ds_list::length

Length of list

3.1.2.6 struct **ds_list_element**∗ ds_list::tail

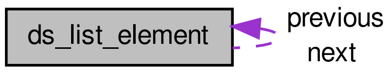
Pointer to tail element

The documentation for this struct was generated from the following file:

- lib/datastruct/ds_list.c

3.2 ds_list_element Struct Reference

Collaboration diagram for ds_list_element:



Data Fields

- void ∗ data
- struct ds_list_element ∗ previous
- struct ds_list_element ∗ next

3.2.1 Detailed Description

List element data structure

3.2.2 Field Documentation

3.2.2.1 void∗ ds_list_element::data

Pointer to data

3.2.2.2 struct ds_list_element∗ ds_list_element::next

Pointer to next element

3.2.2.3 struct ds_list_element∗ ds_list_element::previous

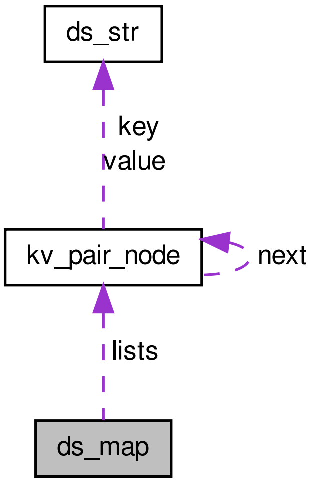
Pointer to previous element

The documentation for this struct was generated from the following file:

- lib/datastruct/ds_list.c

3.3 ds_map Struct Reference

Collaboration diagram for ds_map:



Data Fields

- struct kv_pair_node ∗∗ lists
- size_t hash_size

3.3.1 Detailed Description

Structure to hold a hash map

3.3.2 Field Documentation

3.3.2.1 size_t ds_map::hash_size

Size of array of lists

3.3.2.2 struct kv_pair_node∗∗ ds_map::lists

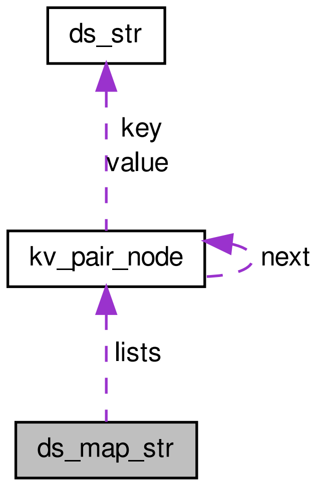
Pointer to array of lists

The documentation for this struct was generated from the following file:

- lib/datastruct/ds_map.c

3.4 ds_map_str Struct Reference

Collaboration diagram for ds_map_str:



Data Fields

- struct kv_pair_node ∗∗ lists
- size_t hash_size

3.4.1 Detailed Description

Structure to hold a hash map

3.4.2 Field Documentation

3.4.2.1 size_t ds_map_str::hash_size

Size of array of lists

3.4.2.2 struct **kv_pair_node**∗∗ ds_map_str::lists

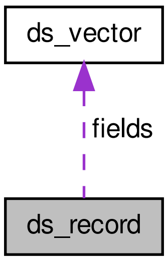
Pointer to array of lists

The documentation for this struct was generated from the following file:

- lib/datastruct/ds_map_str.c

3.5 ds_record Struct Reference

Collaboration diagram for ds_record:



Data Fields

- struct ds_vector ∗ fields

3.5.1 Detailed Description

Vector data structure

3.5.2 Field Documentation

3.5.2.1 struct **ds_vector**∗ ds_record::fields

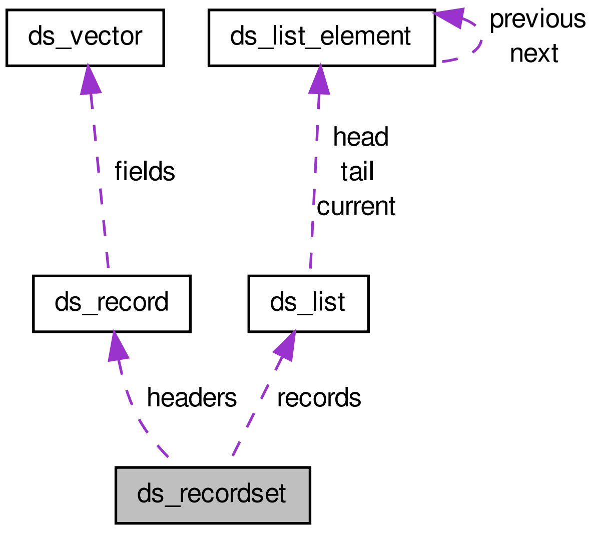
Vector of fields

The documentation for this struct was generated from the following file:

- lib/datastruct/ds_record.c

3.6 ds_recordset Struct Reference

Collaboration diagram for ds_recordset:



Data Fields

- size_t num_fields
- size_t ∗ field_lengths
- ds_record headers
- ds_list records

3.6.1 Detailed Description

Result set structure

3.6.2 Field Documentation

3.6.2.1 size_t∗ ds_recordset::field_lengths

Lengths of the longest fields

3.6.2.2 ds_record ds_recordset::headers

A list of field headers

3.6.2.3 size_t ds_recordset::num_fields

The number of fields in a record

3.6.2.4 ds_list ds_recordset::records

A list of records

The documentation for this struct was generated from the following file:

- lib/datastruct/ds_recordset.c

3.7 ds_str Struct Reference

Data Fields

- char ∗ data
- size_t length
- size_t capacity

3.7.1 Detailed Description

Structure to contain string

3.7.2 Field Documentation

3.7.2.1 size_t ds_str::capacity

The size of the `data` buffer

3.7.2.2 char∗ ds_str::data

The data in C-style string format

3.7.2.3 size_t ds_str::length

The length of the string

The documentation for this struct was generated from the following file:

- lib/datastruct/ds_str.c

3.8 ds_vector Struct Reference

Data Fields

- size_t size
- size_t current
- bool free_on_delete
- void ∗∗ data
- void(∗ data_destructor)(void ∗)

3.8.1 Detailed Description

Vector data structure

3.8.2 Field Documentation

3.8.2.1 size_t ds_vector::current

Current position

3.8.2.2 void∗∗ ds_vector::data

Data array

3.8.2.3 void(∗ ds_vector::data_destructor)(void ∗)

Data destructor function

3.8.2.4 bool ds_vector::free_on_delete

’Free on delete’ flag

3.8.2.5 size_t ds_vector::size

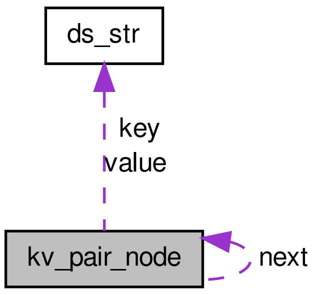
Size of vector

The documentation for this struct was generated from the following file:

- lib/datastruct/ds_vector.c

3.9 kv_pair_node Struct Reference

Collaboration diagram for kv_pair_node:



Data Fields

- char ∗ key
- char ∗ value
- struct kv_pair_node ∗ next

- ds_str key
- ds_str value

3.9.1 Detailed Description

Structure to hold a key-value pair node

3.9.2 Field Documentation

3.9.2.1 ds_str kv_pair_node::key

A pointer to the key

3.9.2.2 char∗ kv_pair_node::key

A pointer to the key

3.9.2.3 struct kv_pair_node ∗ kv_pair_node::next

A pointer to the next node

3.9.2.4 ds_str kv_pair_node::value

A pointer to the value

3.9.2.5 char∗ kv_pair_node::value

A pointer to the value

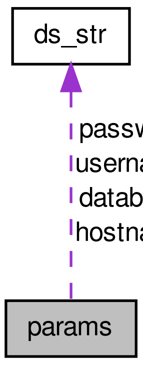
The documentation for this struct was generated from the following files:

- lib/datastruct/ds_map.c
- lib/datastruct/ds_map_str.c

3.10 params Struct Reference

```
#include <config.h>
```

Collaboration diagram for params:



Data Fields

- ds_str hostname
- ds_str database
- ds_str username
- ds_str password
- bool help
- bool version
- bool create
- bool delete_data
- bool sample
- bool list_users
- bool list_entities

3.10.1 Detailed Description

Structure to hold program parameters

3.10.2 Field Documentation

3.10.2.1 bool params::create

Create structure option set

3.10.2.2 ds_str params::database

Database name

3.10.2.3 bool params::delete_data

Delete structure option set

3.10.2.4 bool params::help

Help option set

3.10.2.5 ds_str params::hostname

Database hostname

3.10.2.6 bool params::list_entities

List entities option set

3.10.2.7 bool params::list_users

List users option set

3.10.2.8 ds_str params::password

Password for database access

3.10.2.9 bool params::sample

Load sample data option set

3.10.2.10 ds_str params::username

Username for database access

3.10.2.11 bool params::version

Version option set

The documentation for this struct was generated from the following file:

- config.h

Chapter 4

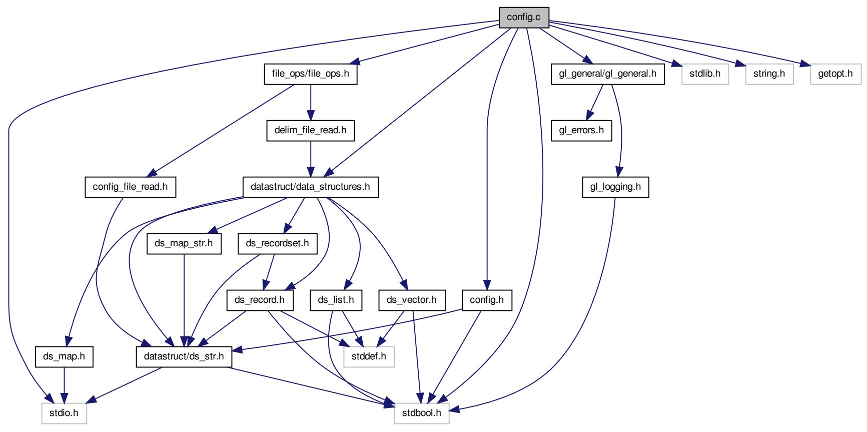
File Documentation

4.1 config.c File Reference

Implementation of program configuration functionality.

```
#include <stdio.h>
#include <stdbool.h>
#include <stdlib.h>
#include <string.h>
#include <getopt.h>
#include "config.h"
#include "file_ops/file_ops.h"
#include "datastruct/data_structures.h"
#include "gl_general/gl_general.h"
```

Include dependency graph for config.c:



Macros

- #define _XOPEN_SOURCE 500

Functions

- struct params * params_init (void)

    Initializes a parameters structure.

- void params_free (struct params ∗params)

  Frees a parameter structure.
- bool get_configuration (struct params ∗params)

  Gets parameters from a configuration file.
- bool get_cmdline_options (int argc, char ∗∗argv, struct params ∗params)

  Gets parameters from the command line.

4.1.1 Detailed Description

Implementation of program configuration functionality. Gets program configuration options from the command line and/or a configuration file.

Author

Paul Griffiths

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4.1.2 Macro Definition Documentation

4.1.2.1 #define _XOPEN_SOURCE 500

UNIX feature test macro

4.1.3 Function Documentation

4.1.3.1 bool get_cmdline_options (int *argc,* char ∗∗ *argv,* struct **params** ∗ *params*)

Gets parameters from the command line.

Parameters

argc	`argc` as passed to `main()`.
argv	`argv` as passed to `main()`.
params	A pointer to a parameters structure to populate.

Returns

`false` if an unrecognized command line option was specified, `true` otherwise.

4.1.3.2 bool get_configuration (struct **params** ∗ *params*)

Gets parameters from a configuration file.

Parameters

params	A pointer to a parameters structure to populate.

Returns

`true` on success, `false` otherwise.

4.1.3.3 void params_free (struct params * *params*)

Frees a parameter structure.

Parameters

params	A pointer to the structure to free.

4.1.3.4 struct params* params_init (void) `[read]`

Initializes a parameters structure.

Returns

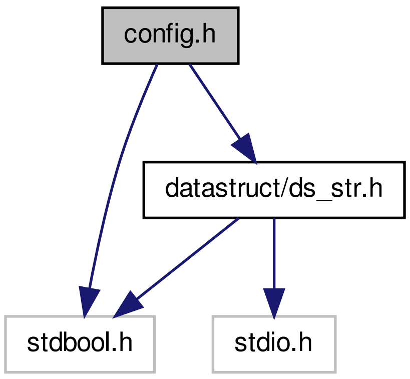
An initialized parameters structure.

4.2 config.h File Reference

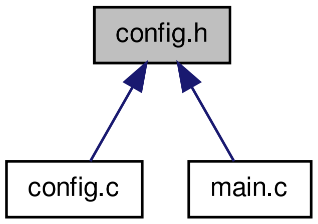
Interface to program configuration functionality.

```
#include <stdbool.h>
#include "datastruct/ds_str.h"
```

Include dependency graph for config.h:



This graph shows which files directly or indirectly include this file:



Data Structures

- struct params

Functions

- struct params ∗ params_init (void)

    Initializes a parameters structure.
- void params_free (struct params ∗params)

    Frees a parameter structure.
- bool get_configuration (struct params ∗params)

    Gets parameters from a configuration file.
- bool get_cmdline_options (int argc, char ∗∗argv, struct params ∗params)

    Gets parameters from the command line.

4.2.1 Detailed Description

Interface to program configuration functionality. Gets program configuration options from the command line and/or a configuration file.

Author

Paul Griffiths

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4.2.2 Function Documentation

4.2.2.1 bool get_cmdline_options (int *argc*, char ∗∗ *argv*, struct **params** ∗ *params*)

Gets parameters from the command line.

Parameters

argc	`argc` as passed to `main()`.
argv	`argv` as passed to `main()`.
params	A pointer to a parameters structure to populate.

Returns

`false` if an unrecognized command line option was specified, `true` otherwise.

4.2.2.2 bool get_configuration (struct **params** ∗ *params*)

Gets parameters from a configuration file.

Parameters

params	A pointer to a parameters structure to populate.

Returns

`true` on success, `false` otherwise.

4.2.2.3 void params_free (struct **params** ∗ *params*)

Frees a parameter structure.

Parameters

params	A pointer to the structure to free.

4.2.2.4 struct **params**∗ params_init (void) `[read]`

Initializes a parameters structure.

Returns

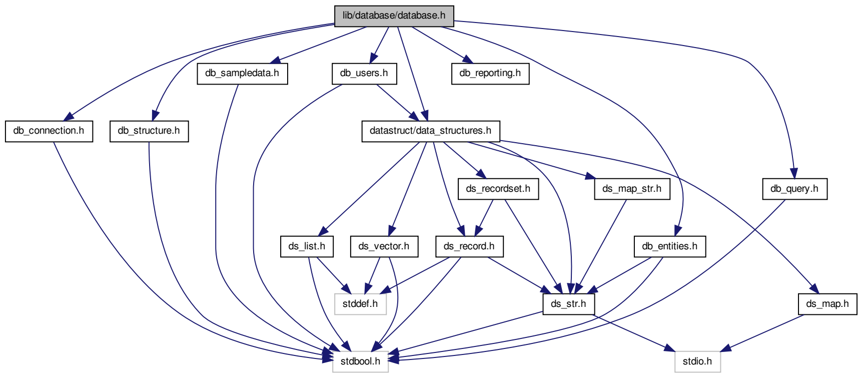
An initialized parameters structure.

4.3 lib/database/database.h File Reference

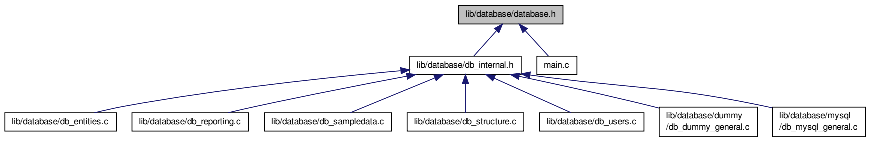
User interface to database functionality.

```
#include "datastruct/data_structures.h"
#include "db_connection.h"
#include "db_structure.h"
#include "db_query.h"
#include "db_sampledata.h"
#include "db_reporting.h"
#include "db_users.h"
#include "db_entities.h"
```

Include dependency graph for database.h:



This graph shows which files directly or indirectly include this file:


lib/database/database.h
lib/database/db_internal.h
main.c
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/dummy /db_dummy_general.c
lib/database/mysql /db_mysql_general.c

4.3.1 Detailed Description

User interface to database functionality.

Author

Paul Griffiths

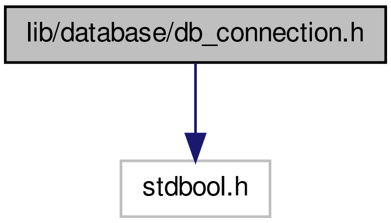
Copyright

4.4 lib/database/db_connection.h File Reference

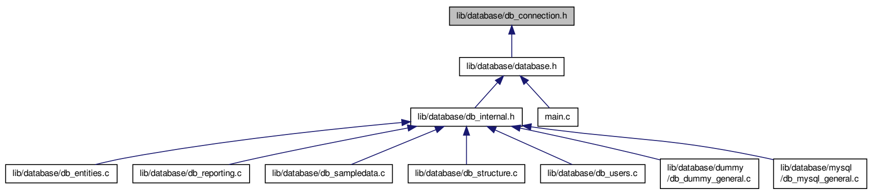
Interface to database connection functionality.

`#include <stdbool.h>`

Include dependency graph for db_connection.h:



This graph shows which files directly or indirectly include this file:


lib/database/db_connection.h
lib/database/database.h
lib/database/db_internal.h
main.c
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/dummy /db_dummy_general.c
lib/database/mysql /db_mysql_general.c

Functions

- bool db_connect (const char ∗host, const char ∗database, const char ∗username, const char ∗password)

    Connects to a database.
- void db_close (void)

    Disconnects from a database.

4.4.1 Detailed Description

Interface to database connection functionality. Function implementations are provided by the individual database components.

Author

Paul Griffiths

Copyright

4.4.2 Function Documentation

4.4.2.1 bool db_connect (const char ∗ *host*, const char ∗ *database*, const char ∗ *username*, const char ∗ *password*)

Connects to a database.

Parameters

host	The hostname.
database	The database name.
username	The username with which to connect.
password	The password for the specified user.

Returns

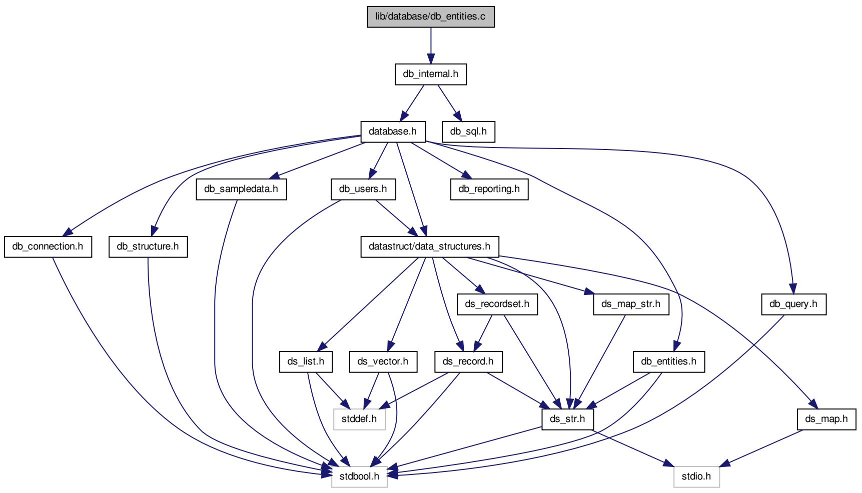
`true` if the connection was successfully made, `false` otherwise.

4.5 lib/database/db_entities.c File Reference

Implementation of entities functionality.

```
#include "db_internal.h"
```

Include dependency graph for db_entities.c:



Functions

- bool db_create_entities_table (void)

    Creates the entities table in the database.
- bool db_drop_entities_table (void)

    Drops the entities table in the database.
- ds_str db_list_entities_report (void)

    Creates a report listing all entities.

4.5.1 Detailed Description

Implementation of entities functionality.

Author

Paul Griffiths

Copyright

4.5.2 Function Documentation

4.5.2.1 bool db_create_entities_table (void)

Creates the entities table in the database.

Returns

`true` on success, `false` on failure.

4.5.2.2 bool db_drop_entities_table (void)

Drops the entities table in the database.

Returns

`true` on success, `false` on failure.

4.5.2.3 ds_str db_list_entities_report (void)

Creates a report listing all entities.

Returns

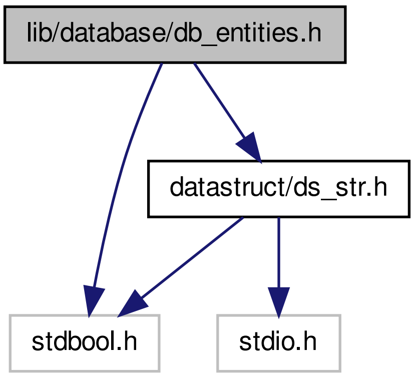
A ds_str containing the report.

4.6 lib/database/db_entities.h File Reference

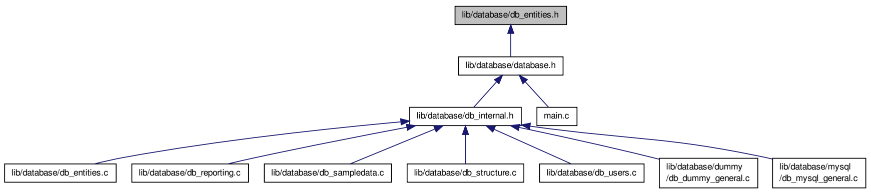
Interface to entities functionality.

```
#include <stdbool.h>
#include "datastruct/ds_str.h"
```

Include dependency graph for db_entities.h:



This graph shows which files directly or indirectly include this file:


lib/database/db_entities.h
lib/database/database.h
lib/database/db_internal.h
main.c
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/dummy /db_dummy_general.c
lib/database/mysql /db_mysql_general.c

Functions

- bool db_create_entities_table (void)

  Creates the entities table in the database.
- bool db_drop_entities_table (void)

  Drops the entities table in the database.
- ds_str db_list_entities_report (void)

  Creates a report listing all entities.

4.6.1 Detailed Description

Interface to entities functionality.

Author

Paul Griffiths

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4.6.2 Function Documentation

4.6.2.1 bool db_create_entities_table (void)

Creates the entities table in the database.

Returns

`true` on success, `false` on failure.

4.6.2.2 bool db_drop_entities_table (void)

Drops the entities table in the database.

Returns

`true` on success, `false` on failure.

4.6.2.3 ds_str db_list_entities_report (void)

Creates a report listing all entities.

Returns

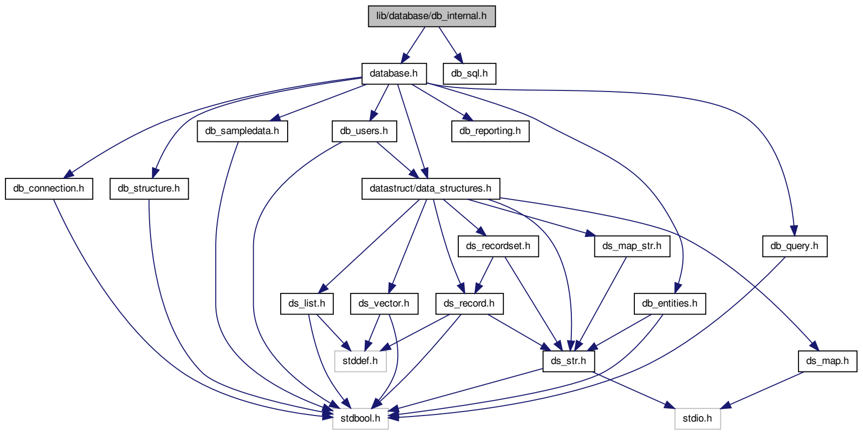
A ds_str containing the report.

4.7 lib/database/db_internal.h File Reference

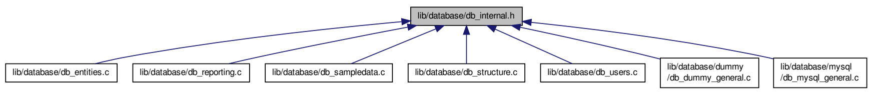
Internal library interface to database functionality.

```
#include "database.h"
#include "db_sql.h"
```

Include dependency graph for db_internal.h:



This graph shows which files directly or indirectly include this file:


lib/database/db_internal.h
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/dummy /db_dummy_general.c
lib/database/mysql /db_mysql_general.c

4.7.1 Detailed Description

Internal library interface to database functionality. The library interface includes the individual SQL functions which should be encapsulated from the user.

Author

Paul Griffiths

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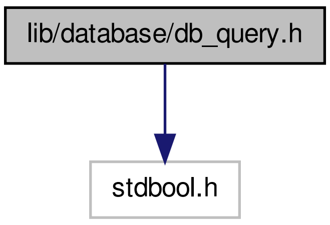
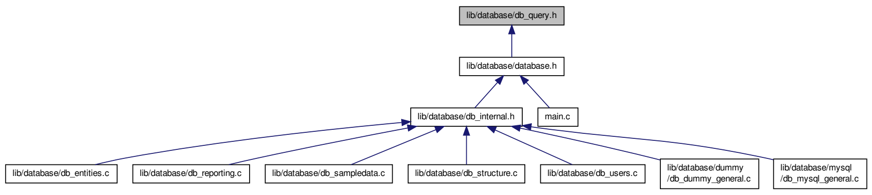
4.8 lib/database/db_query.h File Reference

Interface to database query functionality.

`#include <stdbool.h>`
Include dependency graph for db_query.h:



This graph shows which files directly or indirectly include this file:


lib/database/db_query.h
lib/database/database.h
lib/database/db_internal.h
main.c
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/dummy /db_dummy_general.c
lib/database/mysql /db_mysql_general.c

Functions

- bool db_execute_query (const char ∗query)
  Executes an SQL query on the database.

4.8.1 Detailed Description

Interface to database query functionality. Function implementations are provided by the individual database components.

Author

Paul Griffiths

Copyright

4.8.2 Function Documentation

4.8.2.1 bool db_execute_query (const char ∗ *query*)

Executes an SQL query on the database.

Parameters

query	The query to execute.

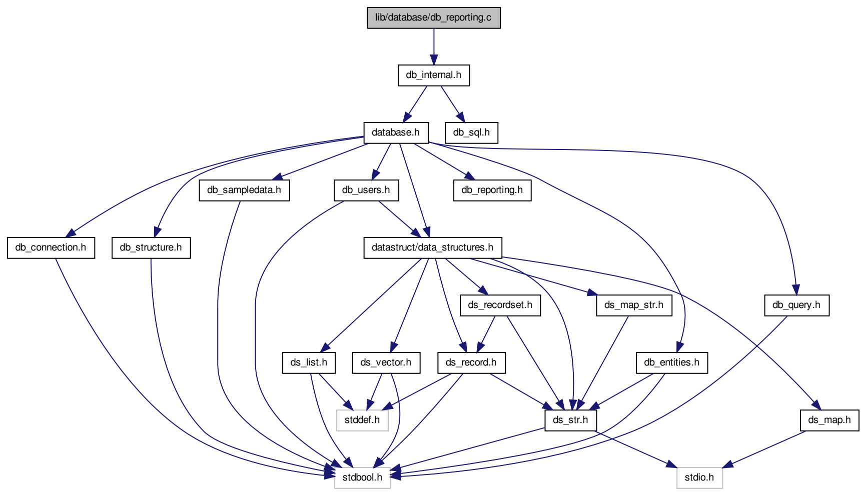
Returns

`true` if the query was successfully executed, `false` otherwise.

4.9 lib/database/db_reporting.c File Reference

Implementation of database reporting functionality.

`#include "db_internal.h"`
Include dependency graph for db_reporting.c:



Functions

- ds_str db_create_report_from_query (const char ∗query)

  Creates a text report from a query.

4.9.1 Detailed Description

Implementation of database reporting functionality.

Author

Paul Griffiths

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4.9.2 Function Documentation

4.9.2.1 ds_str db_create_report_from_query (const char ∗ *query*)

Creates a text report from a query.

Parameters

query	The SELECT query to run.

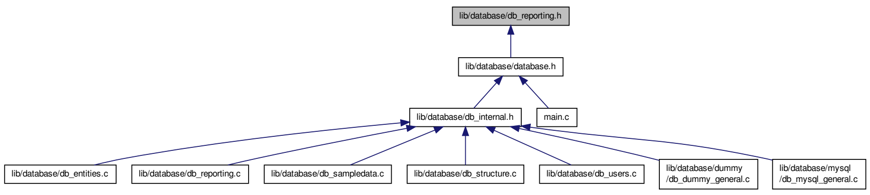
Returns

A ds_str containing the report, or `NULL` on failure.

4.10 lib/database/db_reporting.h File Reference

Interface to database reporting functionality.

This graph shows which files directly or indirectly include this file:


lib/database/db_reporting.h
lib/database/database.h
lib/database/db_internal.h
main.c
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/dummy /db_dummy_general.c
lib/database/mysql /db_mysql_general.c

Functions

- ds_str db_create_report_from_query (const char ∗query)

  Creates a text report from a query.
- ds_recordset db_create_recordset_from_query (const char ∗query)

  Creates a ds_recordset from a query.

4.10.1 Detailed Description

Interface to database reporting functionality. Function implementations may be provided by the individual database components.

Author

Paul Griffiths

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4.10.2 Function Documentation

4.10.2.1 ds_recordset db_create_recordset_from_query (const char ∗ *query*)

Creates a ds_recordset from a query.

Parameters

query	The SELECT query to run.

Returns

A ds_recordset containing the query result, or `NULL` on failure.

4.10.2.2 ds_str db_create_report_from_query (const char ∗ *query*)

Creates a text report from a query.

Parameters

query	The SELECT query to run.

Returns

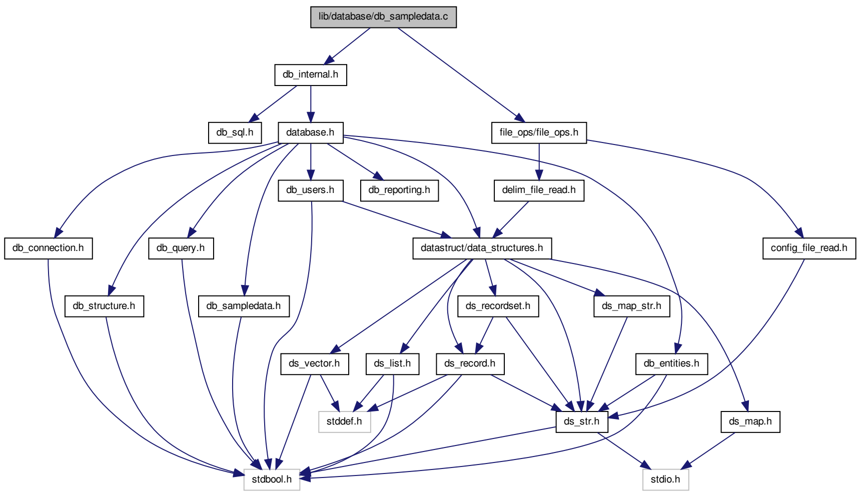
A ds_str containing the report, or `NULL` on failure.

4.11 lib/database/db_sampledata.c File Reference

Implementation of database sample data functionality.

```
#include "db_internal.h"
#include "file_ops/file_ops.h"
```

Include dependency graph for db_sampledata.c:



Functions

- bool db_load_sample_data (void)

  Loads sample data into the database.

4.11.1 Detailed Description

Implementation of database sample data functionality.

Author

Paul Griffiths

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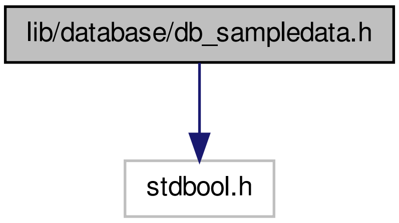
4.12 lib/database/db_sampledata.h File Reference

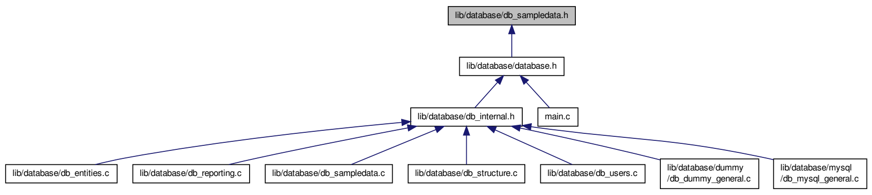
Interface to database sample data functionality.

```
#include <stdbool.h>
```

Include dependency graph for db_sampledata.h:



This graph shows which files directly or indirectly include this file:


lib/database/db_sampledata.h
lib/database/database.h
lib/database/db_internal.h
main.c
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/dummy /db_dummy_general.c
lib/database/mysql /db_mysql_general.c

Functions

- bool db_load_sample_data (void)

  Loads sample data into the database.

4.12.1 Detailed Description

Interface to database sample data functionality.

Author

Paul Griffiths

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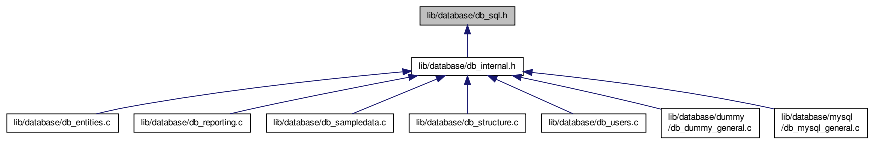
4.13 lib/database/db_sql.h File Reference

Interface to database specific SQL strings.

This graph shows which files directly or indirectly include this file:


lib/database/db_sql.h
lib/database/db_internal.h
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/dummy /db_dummy_general.c
lib/database/mysql /db_mysql_general.c

Functions

- const char ∗ db_create_users_table_sql (void)

  Returns the SQL query to create the users table.
- const char ∗ db_drop_users_table_sql (void)

  Returns the SQL query to drop the users table.
- const char ∗ db_list_users_report_sql (void)

  Returns the SQL query to run the "list users" report.
- const char ∗ db_create_entities_table_sql (void)

  Returns the SQL query to create the entities table.
- const char ∗ db_drop_entities_table_sql (void)

  Returns the SQL query to drop the entities table.
- const char ∗ db_list_entities_report_sql (void)

  Returns the SQL query to run the "list entities" report.

4.13.1 Detailed Description

Interface to database specific SQL strings. Function implementations are provided by the individual database components.

Author

Paul Griffiths

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4.13.2 Function Documentation

4.13.2.1 const char∗ db_create_entities_table_sql (void)

Returns the SQL query to create the entities table.

Returns

The SQL query.

4.13.2.2 const char∗ db_create_users_table_sql (void)

Returns the SQL query to create the users table.

Returns

The SQL query.

4.13.2.3 const char∗ db_drop_entities_table_sql (void)

Returns the SQL query to drop the entities table.

Returns

The SQL query.

4.13.2.4 const char∗ db_drop_users_table_sql (void)

Returns the SQL query to drop the users table.

Returns

The SQL query.

4.13.2.5 const char∗ db_list_entities_report_sql (void)

Returns the SQL query to run the "list entities" report.

Returns

The SQL query.

4.13.2.6 const char∗ db_list_users_report_sql (void)

Returns the SQL query to run the "list users" report.

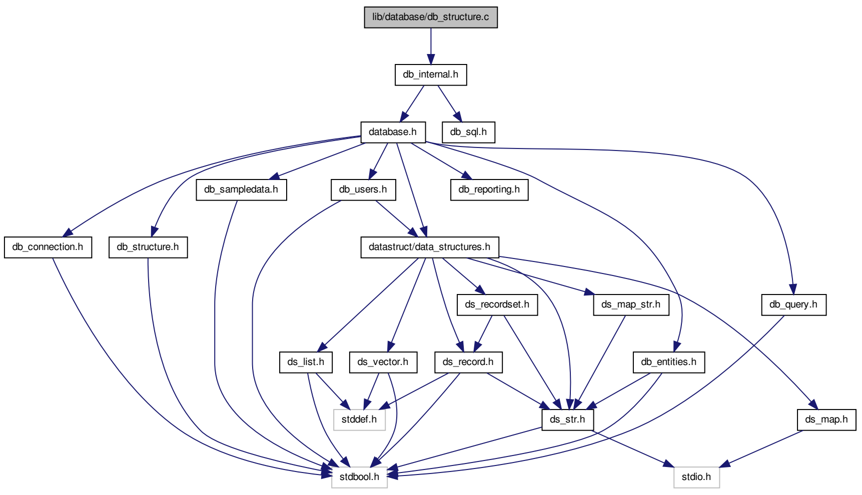
Returns

The SQL query.

4.14 lib/database/db_structure.c File Reference

Implementation of database structure functionality.

`#include "db_internal.h"`
Include dependency graph for db_structure.c:



Functions

- bool db_create_database_structure (void)

  Creates an empty database structure.
- bool db_delete_database_structure (void)

  Deletes the database structure.

4.14.1 Detailed Description

Implementation of database structure functionality.

Author

Paul Griffiths

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4.14.2 Function Documentation

4.14.2.1 bool db_create_database_structure (void)

Creates an empty database structure.

Returns

`true` on success, `false` on failure.

4.14.2.2 bool db_delete_database_structure (void)

Deletes the database structure.

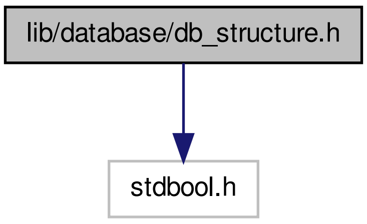
Returns

`true` on success, `false` on failure.

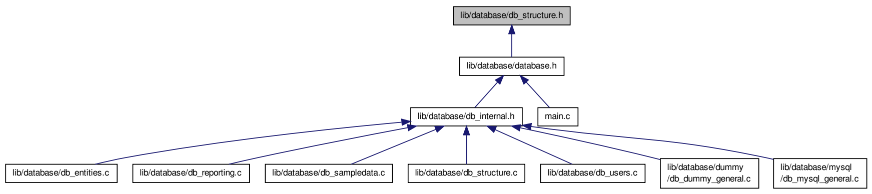
4.15 lib/database/db_structure.h File Reference

Interface to database structure functionality.

`#include <stdbool.h>`
Include dependency graph for db_structure.h:



This graph shows which files directly or indirectly include this file:


lib/database/db_structure.h
lib/database/database.h
lib/database/db_internal.h
main.c
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/dummy /db_dummy_general.c
lib/database/mysql /db_mysql_general.c

Functions

- bool db_create_database_structure (void)

  Creates an empty database structure.
- bool db_delete_database_structure (void)

  Deletes the database structure.

4.15.1 Detailed Description

Interface to database structure functionality.

Author

Paul Griffiths

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4.15.2 Function Documentation

4.15.2.1 bool db_create_database_structure (void)

Creates an empty database structure.

Returns

`true` on success, `false` on failure.

4.15.2.2 bool db_delete_database_structure (void)

Deletes the database structure.

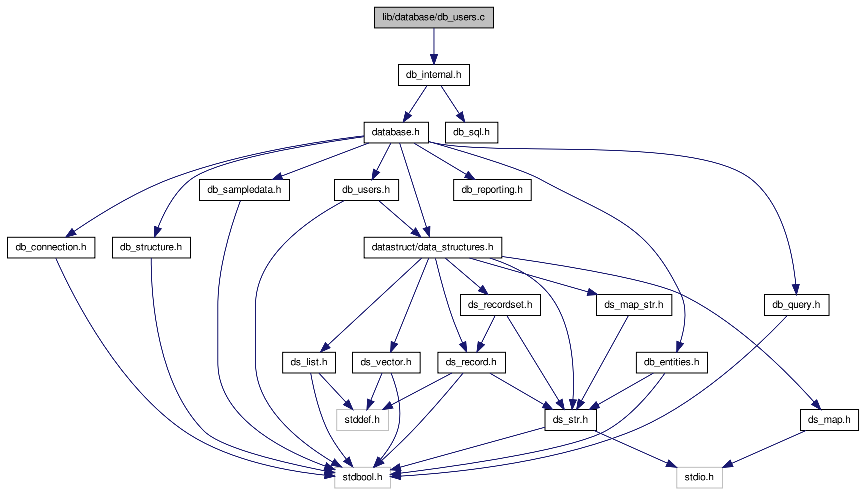
Returns

`true` on success, `false` on failure.

4.16 lib/database/db_users.c File Reference

Implementation of users functionality.

`#include "db_internal.h"`
Include dependency graph for db_users.c:



Functions

- bool db_create_users_table (void)

  Creates the users table in the database.
- bool db_drop_users_table (void)

  Drops the users table from the database.
- ds_str db_list_users_report (void)

  Creates a report listing all users.

4.16.1 Detailed Description

Implementation of users functionality.

Author

Paul Griffiths

Copyright

4.16.2 Function Documentation

4.16.2.1 bool db_create_users_table (void)

Creates the users table in the database.

Returns

`true` on success, `false` on failure.

4.16.2.2 bool db_drop_users_table (void)

Drops the users table from the database.

Returns

`true` on success, `false` on failure.

4.16.2.3 ds_str db_list_users_report (void)

Creates a report listing all users.

Returns

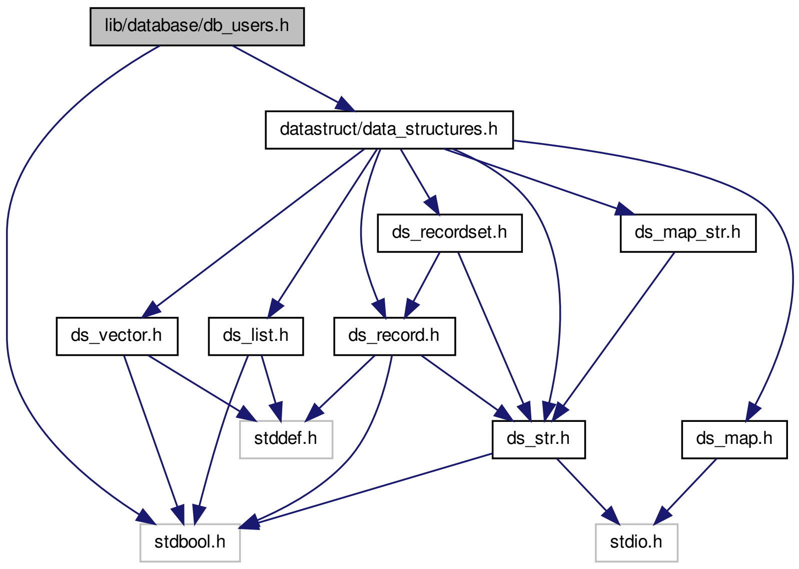
A ds_str containing the report.

4.17 lib/database/db_users.h File Reference

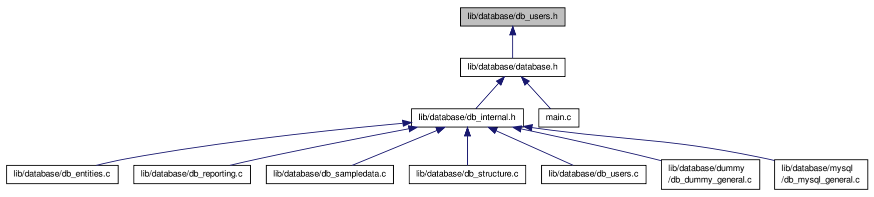
Interface to users functionality.

```
#include <stdbool.h>
#include "datastruct/data_structures.h"
```

Include dependency graph for db_users.h:



This graph shows which files directly or indirectly include this file:


lib/database/db_users.h
lib/database/database.h
lib/database/db_internal.h
main.c
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/dummy /db_dummy_general.c
lib/database/mysql /db_mysql_general.c

Functions

- bool db_create_users_table (void)

  Creates the users table in the database.
- bool db_drop_users_table (void)

  Drops the users table from the database.
- ds_str db_list_users_report (void)

  Creates a report listing all users.

4.17.1 Detailed Description

Interface to users functionality.

Author

Paul Griffiths

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4.17.2 Function Documentation

4.17.2.1 bool db_create_users_table (void)

Creates the users table in the database.

Returns

`true` on success, `false` on failure.

4.17.2.2 bool db_drop_users_table (void)

Drops the users table from the database.

Returns

`true` on success, `false` on failure.

4.17.2.3 ds_str db_list_users_report (void)

Creates a report listing all users.

Returns

A ds_str containing the report.

4.18 lib/database/dummy/db_dummy_create_entities_table_sql.c File Reference

Returns dummy SQL query to create entities table.

Functions

- const char ∗ db_create_entities_table_sql (void)

    Returns the SQL query to create the entities table.

4.18.1 Detailed Description

Returns dummy SQL query to create entities table.

Author

Paul Griffiths

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4.18.2 Function Documentation

4.18.2.1 const char∗ db_create_entities_table_sql (void)

Returns the SQL query to create the entities table.

Returns

The SQL query.

4.19 lib/database/dummy/db_dummy_create_users_table_sql.c File Reference

Returns dummy SQL query to create users table.

Functions

- const char ∗ db_create_users_table_sql (void)

  Returns the SQL query to create the users table.

4.19.1 Detailed Description

Returns dummy SQL query to create users table.

Author

Paul Griffiths

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4.19.2 Function Documentation

4.19.2.1 const char∗ db_create_users_table_sql (void)

Returns the SQL query to create the users table.

Returns

The SQL query.

4.20 lib/database/dummy/db_dummy_drop_entities_table_sql.c File Reference

Returns dummy SQL query to drop entities table.

Functions

- const char ∗ db_drop_entities_table_sql (void)

  Returns the SQL query to drop the entities table.

4.20.1 Detailed Description

Returns dummy SQL query to drop entities table.

Author

Paul Griffiths

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4.20.2 Function Documentation

4.20.2.1 const char∗ db_drop_entities_table_sql (void)

Returns the SQL query to drop the entities table.

Returns

The SQL query.

4.21 lib/database/dummy/db_dummy_drop_users_table_sql.c File Reference

Returns dummy SQL query to drop users table.

Functions

- const char ∗ db_drop_users_table_sql (void)

  Returns the SQL query to drop the users table.

4.21.1 Detailed Description

Returns dummy SQL query to drop users table.

Author

Paul Griffiths

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4.21.2 Function Documentation

4.21.2.1 const char∗ db_drop_users_table_sql (void)

Returns the SQL query to drop the users table.

Returns

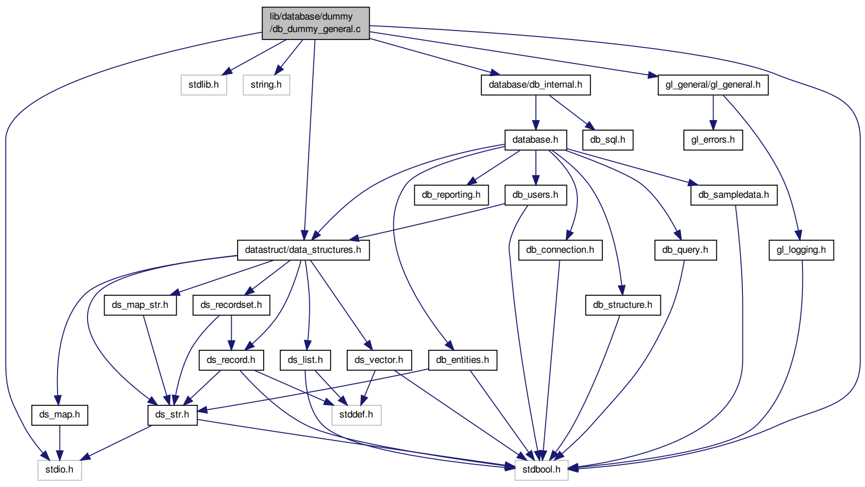
The SQL query.

4.22 lib/database/dummy/db_dummy_general.c File Reference

Implementation of dummy database functionality.

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <stdbool.h>
#include "gl_general/gl_general.h"
#include "database/db_internal.h"
#include "datastruct/data_structures.h"
```

Include dependency graph for db_dummy_general.c:



Macros

- #define _XOPEN_SOURCE 600

Functions

- bool db_connect (const char ∗host, const char ∗database, const char ∗username, const char ∗password)

  Connects to a database.
- void db_close (void)

  Disconnects from a database.
- bool db_execute_query (const char ∗query)

  Executes an SQL query on the database.
- ds_recordset db_create_recordset_from_query (const char ∗query)

  Creates a ds_recordset from a query.

4.22.1 Detailed Description

Implementation of dummy database functionality. This module is useful when compiling for testing purpose on a system without any of the supported database development libraries available.

Author

Paul Griffiths

Copyright

4.22.2 Macro Definition Documentation

4.22.2.1 #define _XOPEN_SOURCE 600

UNIX feature test macro

4.22.3 Function Documentation

4.22.3.1 bool db_connect (const char ∗ *host,* const char ∗ *database,* const char ∗ *username,* const char ∗ *password*)

Connects to a database.

Parameters

host	The hostname.
database	The database name.
username	The username with which to connect.
password	The password for the specified user.

Returns

`true` if the connection was successfully made, `false` otherwise.

4.22.3.2 ds_recordset db_create_recordset_from_query (const char ∗ *query*)

Creates a ds_recordset from a query.

Parameters

query	The SELECT query to run.

Returns

A ds_recordset containing the query result, or `NULL` on failure.

4.22.3.3 bool db_execute_query (const char ∗ *query*)

Executes an SQL query on the database.

Parameters

query	The query to execute.

Returns

`true` if the query was successfully executed, `false` otherwise.

4.23 lib/database/dummy/db_dummy_list_entities_report_sql.c File Reference

Returns dummy SQL query to create list entities report.

Functions

- const char * db_list_entities_report_sql (void)

  Returns the SQL query to run the "list entities" report.

4.23.1 Detailed Description

Returns dummy SQL query to create list entities report.

Author

Paul Griffiths

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4.23.2 Function Documentation

4.23.2.1 const char* db_list_entities_report_sql (void)

Returns the SQL query to run the "list entities" report.

Returns

The SQL query.

4.24 lib/database/dummy/db_dummy_list_users_report_sql.c File Reference

Returns dummy SQL query to create list users report.

Functions

- const char * db_list_users_report_sql (void)

  Returns the SQL query to run the "list users" report.

4.24.1 Detailed Description

Returns dummy SQL query to create list users report.

Author

Paul Griffiths

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4.24.2 Function Documentation

4.24.2.1 const char∗ db_list_users_report_sql (void)

Returns the SQL query to run the "list users" report.

Returns

The SQL query.

4.25 lib/database/mysql/db_mysql_create_entities_table_sql.c File Reference

Returns MYSQL SQL query to create entities table.

Functions

- const char ∗ db_create_entities_table_sql (void)

  Returns the SQL query to create the entities table.

4.25.1 Detailed Description

Returns MYSQL SQL query to create entities table.

Author

Paul Griffiths

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4.25.2 Function Documentation

4.25.2.1 const char∗ db_create_entities_table_sql (void)

Returns the SQL query to create the entities table.

Returns

The SQL query.

4.26 lib/database/mysql/db_mysql_create_users_table_sql.c File Reference

Returns MYSQL SQL query to create users table.

Functions

- const char ∗ db_create_users_table_sql (void)

    Returns the SQL query to create the users table.

4.26.1 Detailed Description

Returns MYSQL SQL query to create users table.

Author

Paul Griffiths

Copyright

4.26.2 Function Documentation

4.26.2.1 const char∗ db_create_users_table_sql (void)

Returns the SQL query to create the users table.

Returns

The SQL query.

4.27 lib/database/mysql/db_mysql_drop_entities_table_sql.c File Reference

Returns MYSQL SQL query to drop entities table.

Functions

- const char ∗ db_drop_entities_table_sql (void)

    Returns the SQL query to drop the entities table.

4.27.1 Detailed Description

Returns MYSQL SQL query to drop entities table.

Author

Paul Griffiths

Copyright

4.27.2 Function Documentation

4.27.2.1 const char∗ db_drop_entities_table_sql (void)

Returns the SQL query to drop the entities table.

Returns

The SQL query.

4.28 lib/database/mysql/db_mysql_drop_users_table_sql.c File Reference

Returns MYSQL SQL query to drop users table.

Functions

- const char ∗ db_drop_users_table_sql (void)

  Returns the SQL query to drop the users table.

4.28.1 Detailed Description

Returns MYSQL SQL query to drop users table.

Author

Paul Griffiths

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4.28.2 Function Documentation

4.28.2.1 const char∗ db_drop_users_table_sql (void)

Returns the SQL query to drop the users table.

Returns

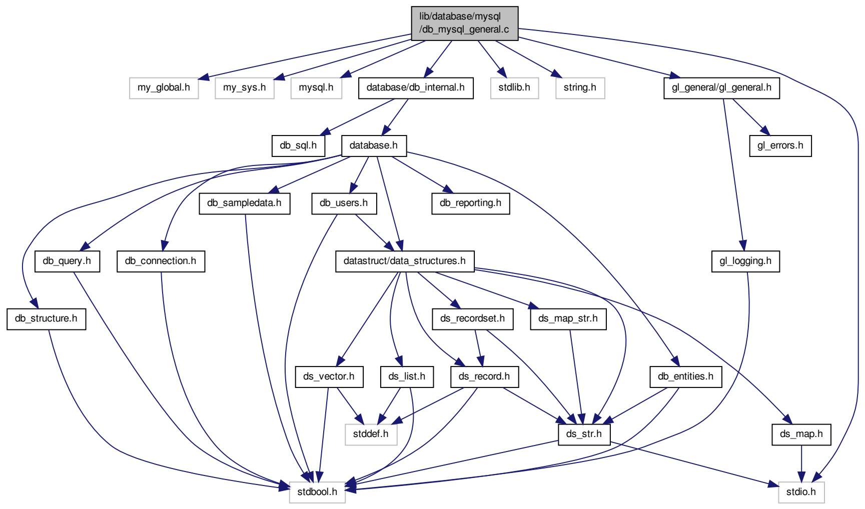
The SQL query.

4.29 lib/database/mysql/db_mysql_general.c File Reference

Implementation of MYSQL database functionality.

```
#include <my_global.h>
#include <my_sys.h>
#include <mysql.h>
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "gl_general/gl_general.h"
#include "database/db_internal.h"
```

Include dependency graph for db_mysql_general.c:



Functions

- bool db_connect (const char ∗host, const char ∗database, const char ∗username, const char ∗password)

    Connects to a database.
- void db_close (void)

    Disconnects from a database.
- bool db_execute_query (const char ∗query)

    Executes an SQL query on the database.
- ds_recordset db_create_recordset_from_query (const char ∗query)

    Creates a ds_recordset from a query.

Variables

- MYSQL ∗ main_mss = NULL
- MYSQL ∗ conn_mss = NULL

4.29.1 Detailed Description

Implementation of MYSQL database functionality.

Author

Paul Griffiths

Copyright

4.29.2 Function Documentation

4.29.2.1 bool db_connect (const char * *host*, const char * *database*, const char * *username*, const char * *password*)

Connects to a database.

Parameters

host	The hostname.
database	The database name.
username	The username with which to connect.
password	The password for the specified user.

Returns

`true` if the connection was successfully made, `false` otherwise.

4.29.2.2 ds_recordset db_create_recordset_from_query (const char * *query*)

Creates a ds_recordset from a query.

Parameters

query	The SELECT query to run.

Returns

A ds_recordset containing the query result, or `NULL` on failure.

4.29.2.3 bool db_execute_query (const char * *query*)

Executes an SQL query on the database.

Parameters

query	The query to execute.

Returns

`true` if the query was successfully executed, `false` otherwise.

4.29.3 Variable Documentation

4.29.3.1 MYSQL* conn_mss = NULL

MYSQL connection object.

4.29.3.2 MYSQL* main_mss = NULL

MYSQL initialization object.

4.30 lib/database/mysql/db_mysql_list_entities_report_sql.c File Reference

Returns MYSQL SQL query to create list entities report.

Functions

- const char ∗ db_list_entities_report_sql (void)

  Returns the SQL query to run the "list entities" report.

4.30.1 Detailed Description

Returns MYSQL SQL query to create list entities report.

Author

Paul Griffiths

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4.30.2 Function Documentation

4.30.2.1 const char∗ db_list_entities_report_sql (void)

Returns the SQL query to run the "list entities" report.

Returns

The SQL query.

4.31 lib/database/mysql/db_mysql_list_users_report_sql.c File Reference

Returns MYSQL SQL query to create list users report.

Functions

- const char ∗ db_list_users_report_sql (void)

  Returns the SQL query to run the "list users" report.

4.31.1 Detailed Description

Returns MYSQL SQL query to create list users report.

Author

Paul Griffiths

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4.31.2 Function Documentation

4.31.2.1 const char∗ db_list_users_report_sql (void)

Returns the SQL query to run the "list users" report.

Returns

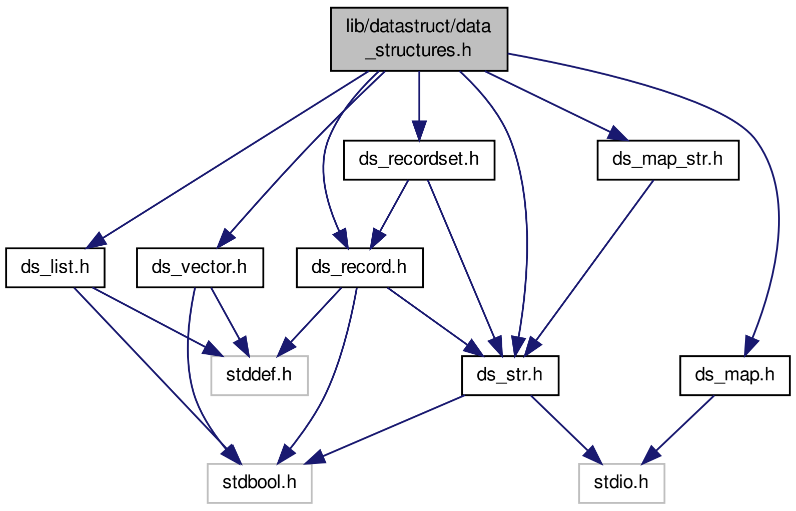
The SQL query.

4.32 lib/datastruct/data_structures.h File Reference

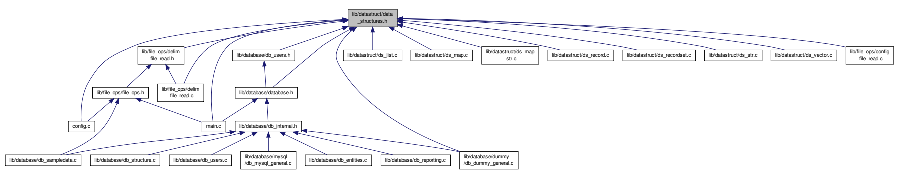
Interface to data structures.

```
#include "ds_list.h"
#include "ds_vector.h"
#include "ds_str.h"
#include "ds_map.h"
#include "ds_map_str.h"
#include "ds_record.h"
#include "ds_recordset.h"
```

Include dependency graph for data_structures.h:



This graph shows which files directly or indirectly include this file:



4.32.1 Detailed Description

Interface to data structures.

Author

Paul Griffiths

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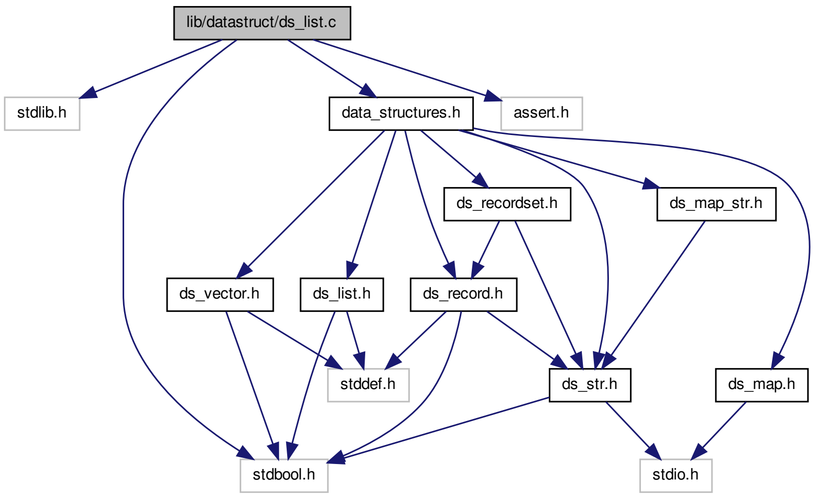
4.33 lib/datastruct/ds_list.c File Reference

Implementation of generic doubly-linked list data structure.

```
#include <stdlib.h>
#include <stdbool.h>
#include <assert.h>
#include "data_structures.h"
```

Include dependency graph for ds_list.c:



Data Structures

- struct ds_list_element
- struct ds_list

Functions

- ds_list ds_list_create (const bool free_on_delete, void(∗destructor)(void ∗))

  Creates a new list.
- void ds_list_destroy (ds_list list)

  Destroys a list and frees any associated resources.

- void ds_list_destructor (void ∗list)

    A list destructor function.
- ds_list ds_list_append (ds_list list, void ∗data)

    Appends an element to a list.
- void ds_list_remove_tail (ds_list list)

    Removes the last element of a list.
- void ds_list_remove_all (ds_list list)

    Removes all the elements from a list.
- void ∗ ds_list_element (ds_list list, const size_t index)

    Retrieves the data at a specified index.
- size_t ds_list_length (ds_list list)

    Returns the number of elements in a list.
- bool ds_list_is_empty (ds_list list)

    Checks if a list is empty.
- void ds_list_seek_start (ds_list list)

    Sets the current element to the first element of a list.
- void ds_list_seek_end (ds_list list)

    Sets the current element to the last element of a list.
- void ∗ ds_list_get_next_data (ds_list list)

    Returns the next element of the list.
- void ∗ ds_list_get_prev_data (ds_list list)

    Returns the previous element of the list.

4.33.1 Detailed Description

Implementation of generic doubly-linked list data structure.

Author

Paul Griffiths

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4.33.2 Function Documentation

4.33.2.1 ds_list ds_list_append (ds_list *list,* void ∗ *element*)

Appends an element to a list.

Parameters

list	The list to which to append.
element	The element to append.

Returns

The same list, or `NULL` on failure.

4.33.2.2 ds_list ds_list_create (const bool *free_on_delete,* void(∗)(void ∗) *destructor*)

Creates a new list.

Parameters

free_on_delete	Set to `true` if the list elements should be destroyed when removed from the list, and when the list itself is destroyed. If set to `false`, the caller is responsible for destroying the elements prior to destroying the list.
destructor	Pointer to a destructor function to use for destroying the list elements, when `free_on_-delete` is true. If this is set to `NULL`, `free()` from the standard C library will be used to destroy the elements.

Returns

A newly created list, or `NULL` on failure.

4.33.2.3 void ds_list_destroy (ds_list *list*)

Destroys a list and frees any associated resources.

Parameters

list	The list to destroy.

4.33.2.4 void ds_list_destructor (void ∗ *list*)

A list destructor function.

This function may be passed to `ds_list_create()` when creating a list of lists. It calls `ds_list_-destroy()`, but the parameter of `ds_list_destroy()` is not compatible with the function signature expected by `ds_list_create()`, so this function provides an appropriate interface.

Parameters

list	The list to destroy.

4.33.2.5 void∗ ds_list_element (ds_list *list,* const size_t *index*)

Retrieves the data at a specified index.

Parameters

list	The list from which to retrieve.
index	The index of the desired element.

Returns

A pointer to the data, or `NULL` if the index is out of range.

4.33.2.6 void∗ ds_list_get_next_data (ds_list *list*)

Returns the next element of the list.

This function returns the data of the "current element", and advances the current element pointer. Subsequent calls to this function will return successive elements.

Parameters

list	The list.

Returns

A pointer to the next element, or `NULL` if the end of the list has been reached.

4.33.2.7 void∗ ds_list_get_prev_data (ds_list *list*)

Returns the previous element of the list.

This function returns the data of the "current element", and decrements the current element pointer. Subsequent calls to this function will return successively earlier elements.

Parameters

list	The list.

Returns

A pointer to the previous element, or `NULL` if the start of the list has been reached.

4.33.2.8 bool ds_list_is_empty (ds_list *list*)

Checks if a list is empty.

Parameters

list	The list to check.

Returns

`true` is the list is empty, `false` otherwise.

4.33.2.9 size_t ds_list_length (ds_list *list*)

Returns the number of elements in a list.

Parameters

list	The list.

Returns

The number of elements in the list.

4.33.2.10 void ds_list_remove_all (ds_list *list*)

Removes all the elements from a list.

Parameters

list	The list from which to remove.

4.33.2.11 void ds_list_remove_tail (**ds_list** *list*)

Removes the last element of a list.

Parameters

list	The list from which to remove.

4.33.2.12 void ds_list_seek_end (**ds_list** *list*)

Sets the current element to the last element of a list.

Parameters

list	The list.

4.33.2.13 void ds_list_seek_start (**ds_list** *list*)

Sets the current element to the first element of a list.

Parameters

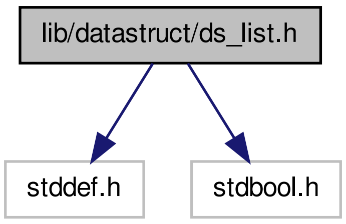
list	The list.

4.34 lib/datastruct/ds_list.h File Reference

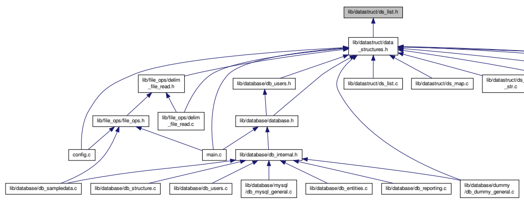
Interface to generic doubly-linked list data structure.

```
#include <stddef.h>
#include <stdbool.h>
```

Include dependency graph for ds_list.h:



This graph shows which files directly or indirectly include this file:


lib/datastruct/ds_list.h
lib/datastruct/data_structures.h
lib/file_ops/delim_file_read.h
lib/database/db_users.h
lib/datastruct/ds_list.c
lib/datastruct/ds_map.c
lib/datastruct/ds_map_str.c
lib/datastruct/ds_record.c
lib/datastruct/ds_recordset.c
lib/datastruct/ds_str.c
lib/datastruct/ds_vector.c
lib/file_ops/config_file_read.c
lib/file_ops/file_ops.h
lib/file_ops/delim_file_read.c
lib/database/database.h
config.c
main.c
lib/database/db_internal.h
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/mysql/db_mysql_general.c
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/dummy/db_dummy_general.c

Typedefs

- typedef struct ds_list ∗ ds_list

Functions

- ds_list ds_list_create (const bool free_on_delete, void(∗destructor)(void ∗))

  Creates a new list.
- void ds_list_destroy (ds_list list)

  Destroys a list and frees any associated resources.
- void ds_list_destructor (void ∗list)

  A list destructor function.
- ds_list ds_list_append (ds_list list, void ∗element)

  Appends an element to a list.
- void ds_list_remove_tail (ds_list list)

  Removes the last element of a list.
- void ds_list_remove_all (ds_list list)

  Removes all the elements from a list.
- void ∗ ds_list_element (ds_list list, const size_t index)

  Retrieves the data at a specified index.
- size_t ds_list_length (ds_list list)

  Returns the number of elements in a list.
- bool ds_list_is_empty (ds_list list)

  Checks if a list is empty.
- void ds_list_seek_start (ds_list list)

  Sets the current element to the first element of a list.
- void ds_list_seek_end (ds_list list)

  Sets the current element to the last element of a list.
- void ∗ ds_list_get_next_data (ds_list list)

  Returns the next element of the list.
- void ∗ ds_list_get_prev_data (ds_list list)

  Returns the previous element of the list.

4.34.1 Detailed Description

Interface to generic doubly-linked list data structure.

Author

Paul Griffiths

Copyright

4.34.2 Typedef Documentation

4.34.2.1 typedef struct **ds_list**∗ **ds_list**

Typedef for opaque list datatype

4.34.3 Function Documentation

4.34.3.1 **ds_list** ds_list_append (**ds_list** *list,* void ∗ *element*)

Appends an element to a list.

Parameters

list	The list to which to append.
element	The element to append.

Returns

The same list, or `NULL` on failure.

4.34.3.2 **ds_list** ds_list_create (const bool *free_on_delete,* void(∗)(void ∗) *destructor*)

Creates a new list.

Parameters

free_on_delete	Set to `true` if the list elements should be destroyed when removed from the list, and when the list itself is destroyed. If set to `false`, the caller is responsible for destroying the elements prior to destroying the list.
destructor	Pointer to a destructor function to use for destroying the list elements, when `free_on_delete` is true. If this is set to `NULL`, `free()` from the standard C library will be used to destroy the elements.

Returns

A newly created list, or `NULL` on failure.

4.34.3.3 void ds_list_destroy (**ds_list** *list*)

Destroys a list and frees any associated resources.

Parameters

list	The list to destroy.

4.34.3.4 void ds_list_destructor (void ∗ *list*)

A list destructor function.

This function may be passed to `ds_list_create()` when creating a list of lists. It calls `ds_list_destroy()`, but the parameter of `ds_list_destroy()` is not compatible with the function signature expected by `ds_list_create()`, so this function provides an appropriate interface.

Parameters

list	The list to destroy.

4.34.3.5 void∗ ds_list_element (ds_list *list*, const size_t *index*)

Retrieves the data at a specified index.

Parameters

list	The list from which to retrieve.
index	The index of the desired element.

Returns

A pointer to the data, or `NULL` if the index is out of range.

4.34.3.6 void∗ ds_list_get_next_data (ds_list *list*)

Returns the next element of the list.

This function returns the data of the "current element", and advances the current element pointer. Subsequent calls to this function will return successive elements.

Parameters

list	The list.

Returns

A pointer to the next element, or `NULL` if the end of the list has been reached.

4.34.3.7 void∗ ds_list_get_prev_data (ds_list *list*)

Returns the previous element of the list.

This function returns the data of the "current element", and decrements the current element pointer. Subsequent calls to this function will return successively earlier elements.

Parameters

list	The list.

Returns

A pointer to the previous element, or `NULL` if the start of the list has been reached.

4.34.3.8 bool ds_list_is_empty (ds_list *list*)

Checks if a list is empty.

Parameters

list	The list to check.

Returns

`true` is the list is empty, `false` otherwise.

4.34.3.9 size_t ds_list_length (ds_list *list*)

Returns the number of elements in a list.

Parameters

list	The list.

Returns

The number of elements in the list.

4.34.3.10 void ds_list_remove_all (ds_list *list*)

Removes all the elements from a list.

Parameters

list	The list from which to remove.

4.34.3.11 void ds_list_remove_tail (ds_list *list*)

Removes the last element of a list.

Parameters

list	The list from which to remove.

4.34.3.12 void ds_list_seek_end (ds_list *list*)

Sets the current element to the last element of a list.

Parameters

list	The list.

4.34.3.13 void ds_list_seek_start (ds_list *list*)

Sets the current element to the first element of a list.

Parameters

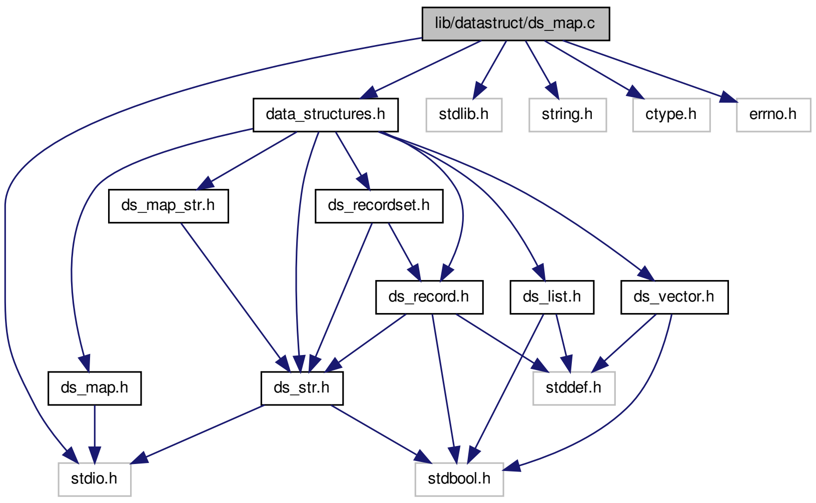
list	The list.

4.35 lib/datastruct/ds_map.c File Reference

Implementation of string-string hash map data structure.

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h>
#include <errno.h>
#include "data_structures.h"
```

Include dependency graph for ds_map.c:



Data Structures

- struct kv_pair_node
- struct ds_map

Macros

- #define _POSIX_C_SOURCE 200809L

  Enables POSIX library functions.

Functions

- ds_map ds_map_init (const size_t hash_size)

  Initializes a hash map.
- void ds_map_destroy (ds_map map)

  Destroys a hash map.
- const char ∗ ds_map_get_value (ds_map map, const char ∗key)

Retrieves a value associated with a key in the map.
- void ds_map_insert (ds_map map, const char ∗key, const char ∗value)

  Inserts a key-value pair into a map.
- void ds_map_print_all (ds_map map, FILE ∗outfile)

  Prints all the key-value pairs in a map to stdout.

4.35.1 Detailed Description

Implementation of string-string hash map data structure.

Author

Paul Griffiths

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4.35.2 Function Documentation

4.35.2.1 void ds_map_destroy (ds_map *map*)

Destroys a hash map.

Parameters

map	A reference to the map to destroy.

4.35.2.2 const char∗ ds_map_get_value (ds_map *map*, const char ∗ *key*)

Retrieves a value associated with a key in the map.

Parameters

map	A reference to the hash map.
key	The key.

Returns

A pointer to the value associated with the key, or `NULL` if the key is not in the map. The caller should not modify the string to which this pointer points.

4.35.2.3 ds_map ds_map_init (const size_t *hash_size*)

Initializes a hash map.

Parameters

hash_size	The number of possible hash values.

Returns

A reference to the newly-created hash map.

4.35.2.4 void ds_map_insert (ds_map *map,* const char ∗ *key,* const char ∗ *value*)

Inserts a key-value pair into a map.

The key and value are copied, so the caller may modify or `free()` them after calling this function.

Parameters

map	A reference to the hash map.
key	The key.
value	The value.

4.35.2.5 void ds_map_print_all (ds_map *map,* FILE ∗ *outfile*)

Prints all the key-value pairs in a map to stdout.

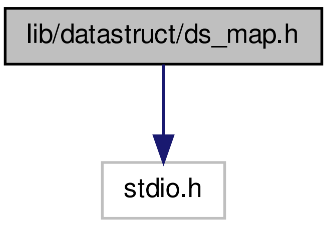
Parameters

map	A reference to the map.
outfile	A FILE pointer to which to print the output.

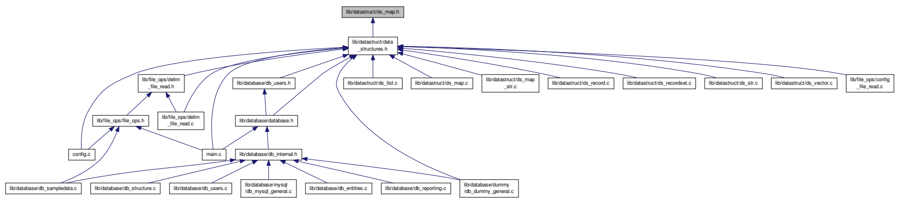
4.36 lib/datastruct/ds_map.h File Reference

Interface to string-string hash map data structure.

`#include <stdio.h>`
Include dependency graph for ds_map.h:



This graph shows which files directly or indirectly include this file:


lib/datastruct/ds_map.h
lib/datastruct/data_structures.h
lib/file_ops/delim_file_read.h
lib/database/db_users.h
lib/datastruct/ds_list.c
lib/datastruct/ds_map.c
lib/datastruct/ds_map_str.c
lib/datastruct/ds_record.c
lib/datastruct/ds_recordset.c
lib/datastruct/ds_str.c
lib/datastruct/ds_vector.c
lib/file_ops/config_file_read.c
lib/file_ops/file_ops.h
lib/file_ops/delim_file_read.c
lib/database/database.h
config.c
main.c
lib/database/db_internal.h
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/mysql/db_mysql_general.c
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/dummy/db_dummy_general.c

Typedefs

- typedef struct ds_map ∗ ds_map

Functions

- ds_map ds_map_init (const size_t hash_size)

    Initializes a hash map.
- void ds_map_destroy (ds_map map)

    Destroys a hash map.
- const char ∗ ds_map_get_value (ds_map map, const char ∗key)

    Retrieves a value associated with a key in the map.
- void ds_map_insert (ds_map map, const char ∗key, const char ∗value)

    Inserts a key-value pair into a map.
- void ds_map_print_all (ds_map map, FILE ∗outfile)

    Prints all the key-value pairs in a map to stdout.

4.36.1 Detailed Description

Interface to string-string hash map data structure.

Author

Paul Griffiths

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4.36.2 Typedef Documentation

4.36.2.1 typedef struct ds_map∗ ds_map

Opaque data type for hash map

4.36.3 Function Documentation

4.36.3.1 void ds_map_destroy (ds_map *map*)

Destroys a hash map.

Parameters

map	A reference to the map to destroy.

4.36.3.2 const char∗ ds_map_get_value (ds_map *map*, const char ∗ *key*)

Retrieves a value associated with a key in the map.

Parameters

map	A reference to the hash map.
key	The key.

Returns

A pointer to the value associated with the key, or `NULL` if the key is not in the map. The caller should not modify the string to which this pointer points.

4.36.3.3 ds_map ds_map_init (const size_t *hash_size*)

Initializes a hash map.

Parameters

hash_size	The number of possible hash values.

Returns

A reference to the newly-created hash map.

4.36.3.4 void ds_map_insert (ds_map *map*, const char ∗ *key*, const char ∗ *value*)

Inserts a key-value pair into a map.

The key and value are copied, so the caller may modify or `free()` them after calling this function.

Parameters

map	A reference to the hash map.
key	The key.
value	The value.

4.36.3.5 void ds_map_print_all (ds_map *map*, FILE ∗ *outfile*)

Prints all the key-value pairs in a map to stdout.

Parameters

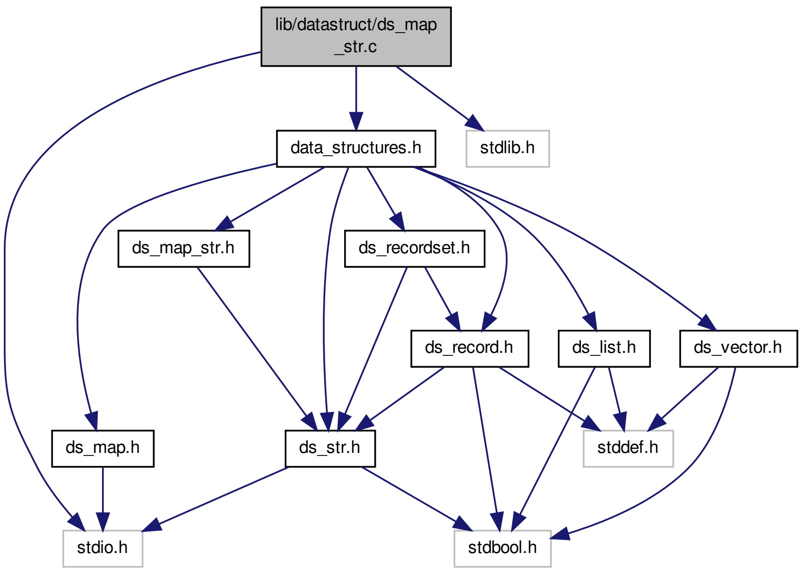
map	A reference to the map.
outfile	A FILE pointer to which to print the output.

4.37 lib/datastruct/ds_map_str.c File Reference

Implementation of string-string hash map data structure.

```
#include <stdio.h>
#include <stdlib.h>
#include "data_structures.h"
```

Include dependency graph for ds_map_str.c:



Data Structures

- struct kv_pair_node
- struct ds_map_str

Functions

- ds_map_str ds_map_str_init (const size_t hash_size)

    Initializes a hash map.
- void ds_map_str_destroy (ds_map_str map)

    Destroys a hash map.
- ds_str ds_map_str_get_value (ds_map_str map, ds_str key)

    Retrieves a value associated with a key in the map.
- void ds_map_str_insert (ds_map_str map, ds_str key, ds_str value)

    Inserts a key-value pair into a map.

4.37.1 Detailed Description

Implementation of string-string hash map data structure.

Author

Paul Griffiths

Copyright

4.37.2 Function Documentation

4.37.2.1 void ds_map_str_destroy (ds_map_str *map*)

Destroys a hash map.

Parameters

map	A reference to the map to destroy.

4.37.2.2 ds_str ds_map_str_get_value (ds_map_str *map,* ds_str *key*)

Retrieves a value associated with a key in the map.

Parameters

map	A reference to the hash map.
key	The key.

Returns

A pointer to the value associated with the key, or `NULL` if the key is not in the map. The caller should not modify the string to which this pointer points.

4.37.2.3 ds_map_str ds_map_str_init (const size_t *hash_size*)

Initializes a hash map.

Parameters

hash_size	The number of possible hash values.

Returns

A reference to the newly-created hash map.

4.37.2.4 void ds_map_str_insert (ds_map_str *map,* ds_str *key,* ds_str *value*)

Inserts a key-value pair into a map.

The key and value are copied, so the caller may modify or `free()` them after calling this function.

Parameters

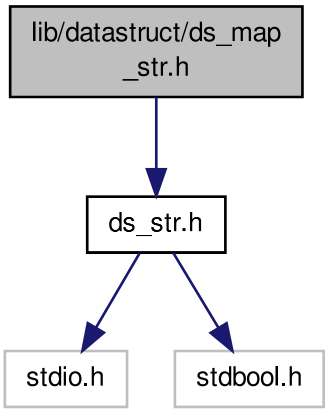
map	A reference to the hash map.
key	The key.
value	The value.

4.38 lib/datastruct/ds_map_str.h File Reference

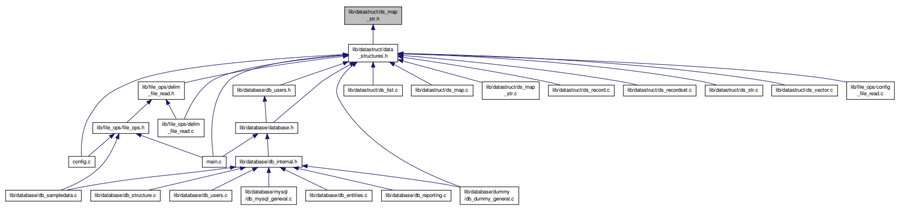
Interface to string-string hash map data structure.

```
#include "ds_str.h"
```

Include dependency graph for ds_map_str.h:



This graph shows which files directly or indirectly include this file:



Typedefs

- typedef struct ds_map_str ∗ ds_map_str

Functions

- ds_map_str ds_map_str_init (const size_t hash_size)

  Initializes a hash map.
- void ds_map_str_destroy (ds_map_str map)

  Destroys a hash map.
- ds_str ds_map_str_get_value (ds_map_str map, ds_str key)

  Retrieves a value associated with a key in the map.
- void ds_map_str_insert (ds_map_str map, ds_str key, ds_str value)

  Inserts a key-value pair into a map.

4.38.1 Detailed Description

Interface to string-string hash map data structure.

Author

Paul Griffiths

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4.38.2 Typedef Documentation

4.38.2.1 typedef struct ds_map_str* ds_map_str

Opaque data type for hash map

4.38.3 Function Documentation

4.38.3.1 void ds_map_str_destroy (ds_map_str *map*)

Destroys a hash map.

Parameters

map	A reference to the map to destroy.

4.38.3.2 ds_str ds_map_str_get_value (ds_map_str *map*, ds_str *key*)

Retrieves a value associated with a key in the map.

Parameters

map	A reference to the hash map.
key	The key.

Returns

A pointer to the value associated with the key, or `NULL` if the key is not in the map. The caller should not modify the string to which this pointer points.

4.38.3.3 ds_map_str ds_map_str_init (const size_t *hash_size*)

Initializes a hash map.

Parameters

hash_size	The number of possible hash values.

Returns

A reference to the newly-created hash map.

4.38.3.4 void ds_map_str_insert (ds_map_str *map*, ds_str *key*, ds_str *value*)

Inserts a key-value pair into a map.

The key and value are copied, so the caller may modify or `free()` them after calling this function.

Parameters

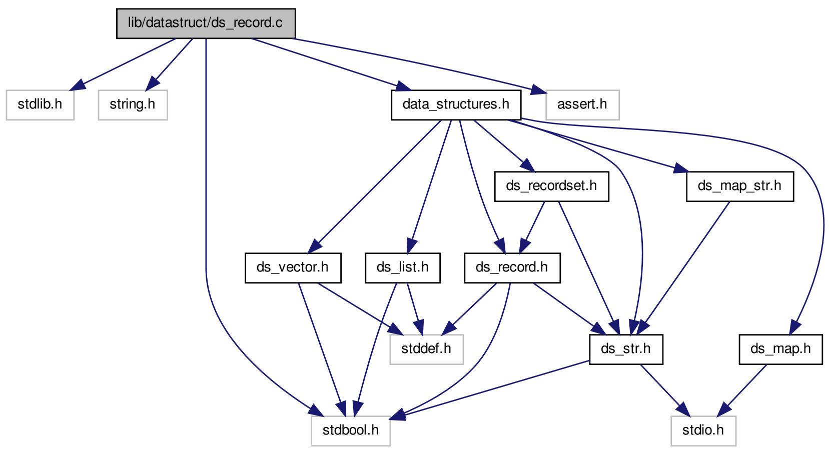
map	A reference to the hash map.
key	The key.
value	The value.

4.39 lib/datastruct/ds_record.c File Reference

Implementation of record database structure.

```
#include <stdlib.h>
#include <string.h>
#include <stdbool.h>
#include <assert.h>
#include "data_structures.h"
```

Include dependency graph for ds_record.c:



Data Structures

- struct ds_record

Functions

- ds_record ds_record_create (const size_t size)

    Creates a new record.
- void ds_record_destroy (ds_record record)

Destroys a record and frees any associated resources.
- void ds_record_destructor (void ∗record)

  A record destructor function.
- void ds_record_clear (ds_record record)

  Clears and `free()`s all the elements in a record.
- void ds_record_set_field (ds_record record, const size_t index, ds_str field)

  Sets a field of a record.
- ds_str ds_record_get_field (ds_record record, const size_t index)

  Retrieves the field at a specified index.
- size_t ds_record_size (ds_record record)

  Returns the size of a record.
- void ds_record_seek_start (ds_record record)

  Sets the current field to the first field of a record.
- ds_str ds_record_get_next_data (ds_record record)

  Returns the next field of the record.
- ds_record ds_record_tokenize (ds_str str, const char delim)

  Tokenizes a string into a record.
- ds_str ds_record_make_delim_string (ds_record record, const char delim)

  Makes a delimited string from a record.
- ds_str ds_record_make_values_string (ds_record record)

  Makes a delimited SQL values string from a record.

4.39.1 Detailed Description

Implementation of record database structure.

Author

Paul Griffiths

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4.39.2 Function Documentation

4.39.2.1 void ds_record_clear (ds_record *record*)

Clears and `free()`s all the elements in a record.

Parameters

record	The record.

4.39.2.2 ds_record ds_record_create (const size_t *size*)

Creates a new record.

Parameters

size	The size of the record.

Returns

A newly created record, or `NULL` on failure.

4.39.2.3 void ds_record_destroy (**ds_record** *record*)

Destroys a record and frees any associated resources.

Parameters

record	The record to destroy.

4.39.2.4 void ds_record_destructor (void $*$ *record*)

A record destructor function.

Parameters

record	The record to destroy.

4.39.2.5 **ds_str** ds_record_get_field (**ds_record** *record,* const size_t *index*)

Retrieves the field at a specified index.

Parameters

record	The record from which to retrieve.
index	The index of the desired field.

Returns

A pointer to the field, or `NULL` if the index is out of range.

4.39.2.6 **ds_str** ds_record_get_next_data (**ds_record** *record*)

Returns the next field of the record.

This function returns the data of the "current field", and advances the current field pointer. Subsequent calls to this function will return successive fields.

Parameters

record	The record.

Returns

A pointer to the next field, or `NULL` if the end of the record has been reached.

4.39.2.7 **ds_str** ds_record_make_delim_string (**ds_record** *record,* const char *delim*)

Makes a delimited string from a record.

Parameters

record	The record.
delim	The delimiting character.

Returns

The delimited string, or `NULL` on failure.

4.39.2.8 ds_str ds_record_make_values_string (ds_record *record*)

Makes a delimited SQL values string from a record.

Parameters

record	The record.

Returns

The delimited values string, or `NULL` on failure.

4.39.2.9 void ds_record_seek_start (ds_record *record*)

Sets the current field to the first field of a record.

Parameters

record	The record.

4.39.2.10 void ds_record_set_field (ds_record *record,* const size_t *index,* ds_str *field*)

Sets a field of a record.

If the field is currently occupied, the existing field is `free()`d.

Parameters

record	The record to set.
index	The index of the field to set.
field	The value to which to set the field.

4.39.2.11 size_t ds_record_size (ds_record *record*)

Returns the size of a record.

Parameters

record	The record.

Returns

The size of the record.

4.39.2.12 ds_record ds_record_tokenize (ds_str *str,* const char *delim*)

Tokenizes a string into a record.

Parameters

str	The string to tokenize.
delim	The delimiting character.

Returns

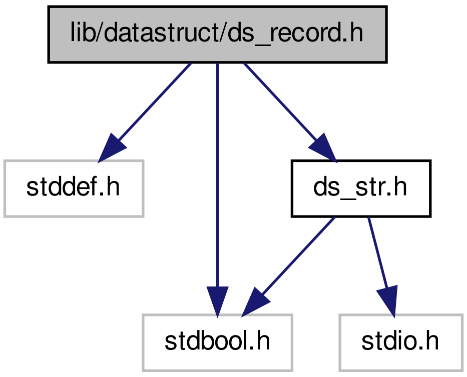
A new record containing the tokens.

4.40 lib/datastruct/ds_record.h File Reference

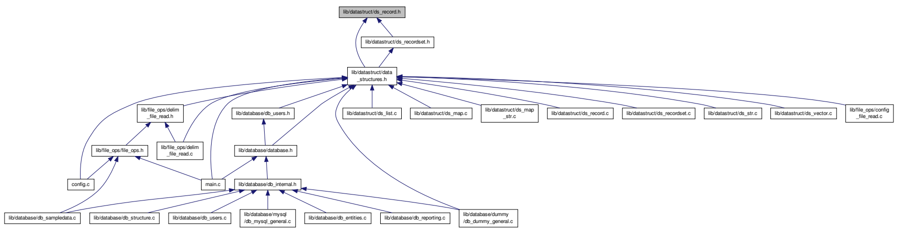
Interface to record data structure.

```
#include <stddef.h>
#include <stdbool.h>
#include "ds_str.h"
```

Include dependency graph for ds_record.h:



This graph shows which files directly or indirectly include this file:


lib/datastruct/ds_record.h
lib/datastruct/ds_recordset.h
lib/datastruct/data_structures.h
lib/file_ops/delim_file_read.h
lib/database/db_users.h
lib/datastruct/ds_list.c
lib/datastruct/ds_map.c
lib/datastruct/ds_map_str.c
lib/datastruct/ds_record.c
lib/datastruct/ds_recordset.c
lib/datastruct/ds_str.c
lib/datastruct/ds_vector.c
lib/file_ops/config_file_read.c
lib/file_ops/file_ops.h
lib/file_ops/delim_file_read.c
lib/database/database.h
config.c
main.c
lib/database/db_internal.h
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/mysql/db_mysql_general.c
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/dummy/db_dummy_general.c

Typedefs

- typedef struct ds_record ∗ ds_record

Functions

- ds_record ds_record_create (const size_t size)

  Creates a new record.
- void ds_record_destroy (ds_record record)

  Destroys a record and frees any associated resources.
- void ds_record_destructor (void *record)

  A record destructor function.
- void ds_record_clear (ds_record record)

  Clears and `free()`s all the elements in a record.
- void ds_record_set_field (ds_record record, const size_t index, ds_str field)

  Sets a field of a record.
- ds_str ds_record_get_field (ds_record record, const size_t index)

  Retrieves the field at a specified index.
- size_t ds_record_size (ds_record record)

  Returns the size of a record.
- void ds_record_seek_start (ds_record record)

  Sets the current field to the first field of a record.
- ds_str ds_record_get_next_data (ds_record record)

  Returns the next field of the record.
- ds_record ds_record_tokenize (ds_str str, const char delim)

  Tokenizes a string into a record.
- ds_str ds_record_make_delim_string (ds_record record, const char delim)

  Makes a delimited string from a record.
- ds_str ds_record_make_values_string (ds_record record)

  Makes a delimited SQL values string from a record.

4.40.1 Detailed Description

Interface to record data structure.

Author

Paul Griffiths

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4.40.2 Typedef Documentation

4.40.2.1 typedef struct ds_record* ds_record

Typedef for opaque record datatype

4.40.3 Function Documentation

4.40.3.1 void ds_record_clear (ds_record *record*)

Clears and `free()`s all the elements in a record.

Parameters

record	The record.

4.40.3.2 ds_record ds_record_create (const size_t *size*)

Creates a new record.

Parameters

size	The size of the record.

Returns

A newly created record, or `NULL` on failure.

4.40.3.3 void ds_record_destroy (ds_record *record*)

Destroys a record and frees any associated resources.

Parameters

record	The record to destroy.

4.40.3.4 void ds_record_destructor (void $*$ *record*)

A record destructor function.

Parameters

record	The record to destroy.

4.40.3.5 ds_str ds_record_get_field (ds_record *record,* const size_t *index*)

Retrieves the field at a specified index.

Parameters

record	The record from which to retrieve.
index	The index of the desired field.

Returns

A pointer to the field, or `NULL` if the index is out of range.

4.40.3.6 ds_str ds_record_get_next_data (ds_record *record*)

Returns the next field of the record.

This function returns the data of the "current field", and advances the current field pointer. Subsequent calls to this function will return successive fields.

Parameters

record	The record.

Returns

A pointer to the next field, or `NULL` if the end of the record has been reached.

4.40.3.7 ds_str ds_record_make_delim_string (ds_record *record,* const char *delim*)

Makes a delimited string from a record.

Parameters

record	The record.
delim	The delimiting character.

Returns

The delimited string, or `NULL` on failure.

4.40.3.8 ds_str ds_record_make_values_string (ds_record *record*)

Makes a delimited SQL values string from a record.

Parameters

record	The record.

Returns

The delimited values string, or `NULL` on failure.

4.40.3.9 void ds_record_seek_start (ds_record *record*)

Sets the current field to the first field of a record.

Parameters

record	The record.

4.40.3.10 void ds_record_set_field (ds_record *record,* const size_t *index,* ds_str *field*)

Sets a field of a record.

If the field is currently occupied, the existing field is `free()`d.

Parameters

record	The record to set.
index	The index of the field to set.
field	The value to which to set the field.

4.40.3.11 size_t ds_record_size (ds_record *record*)

Returns the size of a record.

Parameters

record	The record.

Returns

The size of the record.

4.40.3.12 ds_record ds_record_tokenize (ds_str *str,* const char *delim*)

Tokenizes a string into a record.

Parameters

str	The string to tokenize.
delim	The delimiting character.

Returns

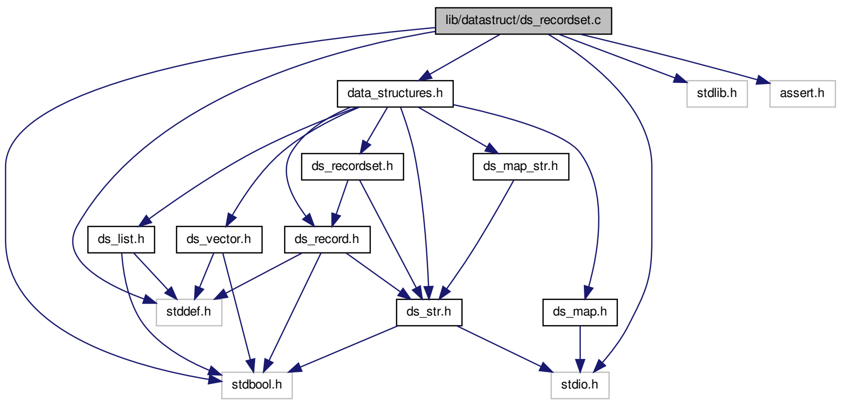
A new record containing the tokens.

4.41 lib/datastruct/ds_recordset.c File Reference

Implementation of query result set structure.

```
#include <stdio.h>
#include <stdlib.h>
#include <stddef.h>
#include <stdbool.h>
#include <assert.h>
#include "data_structures.h"
```

Include dependency graph for ds_recordset.c:



Data Structures

- struct ds_recordset

Functions

- ds_recordset ds_recordset_create (const size_t num_fields)

  Creates a new record set.
- void ds_recordset_destroy (ds_recordset set)

  Destroys a record set and frees associated resources.
- ds_record ds_recordset_add_record (ds_recordset set, ds_record record)

  Adds a record to a record set.
- size_t ds_recordset_num_fields (ds_recordset set)

  Returns the number of fields in a record set.
- size_t ds_recordset_num_records (ds_recordset set)

  Returns the number of records in a record set.
- void ds_recordset_set_headers (ds_recordset set, ds_record headers)

  Sets the record headers in a record set.
- ds_str ds_recordset_get_text_report (ds_recordset set)

  Returns a formatted text report for the record set.
- void ds_recordset_seek_start (ds_recordset set)

  Sets the current record to the first record.
- ds_record ds_recordset_next_record (ds_recordset set)

  Returns the next record in the record set.
- ds_str ds_recordset_get_next_insert_query (ds_recordset set, const char ∗table_name)

  Gets the next SQL INSERT query.

4.41.1 Detailed Description

Implementation of query result set structure.

Author

Paul Griffiths

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4.41.2 Function Documentation

4.41.2.1 ds_record ds_recordset_add_record (ds_recordset *set,* ds_record *record*)

Adds a record to a record set.

The record *must* have the same number of fields as the number of fields provided to `ds_recordset_create()`.

Parameters

set	The record set to which to add.
record	The record to add.

Returns

A pointer to the new record (i.e. it returns the second parameter) or `NULL` on failure.

4.41.2.2 ds_recordset ds_recordset_create (const size_t *num_fields*)

Creates a new record set.

Parameters

num_fields	The non-zero number of fields in the record set.

Returns

A pointer to the new record set.

4.41.2.3 void ds_recordset_destroy (ds_recordset *set*)

Destroys a record set and frees associated resources.

Parameters

set	The record set to destroy.

4.41.2.4 ds_str ds_recordset_get_next_insert_query (ds_recordset *set*, const char ∗ *table_name*)

Gets the next SQL INSERT query.

Parameters

set	The set.
table_name	The table name into which to insert.

Returns

The query. Caller is responsible for `free()`ing.

4.41.2.5 ds_str ds_recordset_get_text_report (ds_recordset *set*)

Returns a formatted text report for the record set.

The report is returned as a single multi-line string.

Parameters

set	The record set.

Returns

A pointer to the report. The caller is responsible for `free()`ing this pointer.

4.41.2.6 ds_record ds_recordset_next_record (ds_recordset *set*)

Returns the next record in the record set.

This function returns the "current record", and advances the current record pointer. Subsequent calls to this function will return successive records.

Parameters

set	The record set.

Returns

A pointer to the next record, or `NULL` if the end of the record set has been reached.

4.41.2.7 size_t ds_recordset_num_fields (**ds_recordset** *set*)

Returns the number of fields in a record set.

Parameters

set	The record set.

Returns

The number of fields in the record set.

4.41.2.8 size_t ds_recordset_num_records (**ds_recordset** *set*)

Returns the number of records in a record set.

Parameters

set	The record set.

Returns

The number of records in the record set.

4.41.2.9 void ds_recordset_seek_start (**ds_recordset** *set*)

Sets the current record to the first record.

Parameters

set	The record set.

4.41.2.10 void ds_recordset_set_headers (**ds_recordset** *set,* **ds_record** *headers*)

Sets the record headers in a record set.

Parameters

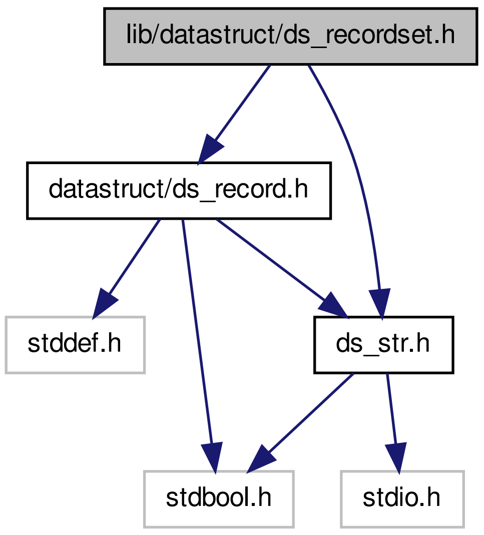
set	The record set.
headers	The headers, in the form of a `ds_record` of strings. The list *must* have the same number of elements as the number of fields provided to `ds_recordset_create()`.

4.42 lib/datastruct/ds_recordset.h File Reference

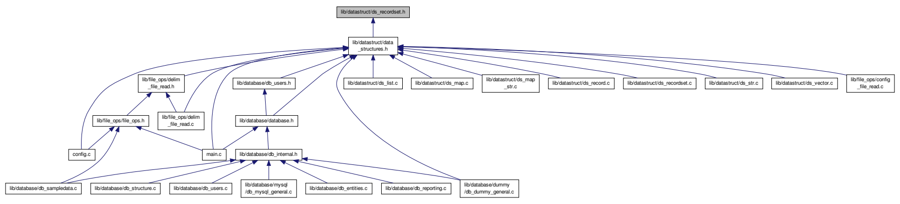
Interface to record set structure.

```
#include "datastruct/ds_record.h"
#include "datastruct/ds_str.h"
```

Include dependency graph for ds_recordset.h:



This graph shows which files directly or indirectly include this file:



Typedefs

- typedef struct ds_recordset ∗ ds_recordset

Functions

- ds_recordset ds_recordset_create (const size_t num_fields)

  Creates a new record set.
- void ds_recordset_destroy (ds_recordset set)

  Destroys a record set and frees associated resources.
- ds_record ds_recordset_add_record (ds_recordset set, ds_record record)

Adds a record to a record set.
- size_t ds_recordset_num_fields (ds_recordset set)

  Returns the number of fields in a record set.
- size_t ds_recordset_num_records (ds_recordset set)

  Returns the number of records in a record set.
- void ds_recordset_set_headers (ds_recordset set, ds_record headers)

  Sets the record headers in a record set.
- ds_str ds_recordset_get_text_report (ds_recordset set)

  Returns a formatted text report for the record set.
- ds_str ds_recordset_get_next_insert_query (ds_recordset set, const char ∗table_name)

  Gets the next SQL INSERT query.
- void ds_recordset_seek_start (ds_recordset set)

  Sets the current record to the first record.
- ds_record ds_recordset_next_record (ds_recordset set)

  Returns the next record in the record set.

4.42.1 Detailed Description

Interface to record set structure.

Author

Paul Griffiths

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4.42.2 Typedef Documentation

4.42.2.1 typedef struct **ds_recordset∗ ds_recordset**

Typedef for opaque record set data type

4.42.3 Function Documentation

4.42.3.1 **ds_record** ds_recordset_add_record (**ds_recordset** *set,* **ds_record** *record*)

Adds a record to a record set.

The record *must* have the same number of fields as the number of fields provided to `ds_recordset_create()`.

Parameters

set	The record set to which to add.
record	The record to add.

Returns

A pointer to the new record (i.e. it returns the second parameter) or `NULL` on failure.

4.42.3.2 **ds_recordset** ds_recordset_create (const size_t *num_fields*)

Creates a new record set.

Parameters

num_fields	The non-zero number of fields in the record set.

Returns

A pointer to the new record set.

4.42.3.3 void ds_recordset_destroy (**ds_recordset** *set*)

Destroys a record set and frees associated resources.

Parameters

set	The record set to destroy.

4.42.3.4 **ds_str** ds_recordset_get_next_insert_query (**ds_recordset** *set,* const char * *table_name*)

Gets the next SQL INSERT query.

Parameters

set	The set.
table_name	The table name into which to insert.

Returns

The query. Caller is responsible for `free()` ing.

4.42.3.5 **ds_str** ds_recordset_get_text_report (**ds_recordset** *set*)

Returns a formatted text report for the record set.

The report is returned as a single multi-line string.

Parameters

set	The record set.

Returns

A pointer to the report. The caller is responsible for `free()` ing this pointer.

4.42.3.6 **ds_record** ds_recordset_next_record (**ds_recordset** *set*)

Returns the next record in the record set.

This function returns the "current record", and advances the current record pointer. Subsequent calls to this function will return successive records.

Parameters

set	The record set.

Returns

A pointer to the next record, or `NULL` if the end of the record set has been reached.

4.42.3.7 size_t ds_recordset_num_fields (ds_recordset *set*)

Returns the number of fields in a record set.

Parameters

set	The record set.

Returns

The number of fields in the record set.

4.42.3.8 size_t ds_recordset_num_records (ds_recordset *set*)

Returns the number of records in a record set.

Parameters

set	The record set.

Returns

The number of records in the record set.

4.42.3.9 void ds_recordset_seek_start (ds_recordset *set*)

Sets the current record to the first record.

Parameters

set	The record set.

4.42.3.10 void ds_recordset_set_headers (ds_recordset *set*, ds_record *headers*)

Sets the record headers in a record set.

Parameters

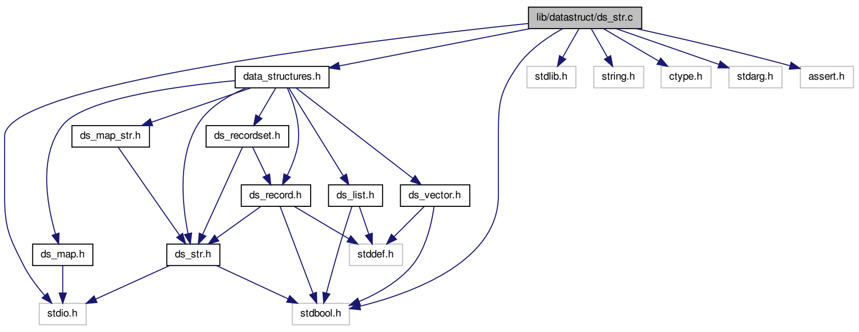
set	The record set.
headers	The headers, in the form of a `ds_record` of strings. The list *must* have the same number of elements as the number of fields provided to `ds_recordset_create()`.

4.43 lib/datastruct/ds_str.c File Reference

Implementation of string data structure.

```
#include <stdio.h>
#include <stdlib.h>
#include <stdbool.h>
#include <string.h>
#include <ctype.h>
#include <stdarg.h>
#include <assert.h>
#include "data_structures.h"
```

Include dependency graph for ds_str.c:



Data Structures

- struct ds_str

Functions

- ds_str ds_str_create_direct (char ∗init_str, const size_t init_str_size)

  Creates a string using allocated memory.
- ds_str ds_str_create (const char ∗init_str)

  Creates a new string from a C-style string.
- ds_str ds_str_dup (ds_str src)

  Creates a new string from another string.
- ds_str ds_str_create_sprintf (const char ∗format,...)

  Creates a string with `sprintf()`-type format.
- void ds_str_destroy (ds_str str)

  Destroys a string and releases allocated resources.
- void ds_str_destructor (void ∗str)

  Destroys a string and releases allocated resources.
- ds_str ds_str_assign (ds_str dst, ds_str src)

  Assigns a string to another.
- ds_str ds_str_assign_cstr (ds_str dst, const char ∗src)

  Assigns a C-style string to a string.
- const char ∗ ds_str_cstr (ds_str str)

  Returns a C-style string containing the string's contents.
- size_t ds_str_length (ds_str str)

Returns the length of a string.

- ds_str ds_str_size_to_fit (ds_str str)

  Reduces a string's capacity to fit its length.

- ds_str ds_str_concat (ds_str dst, ds_str src)

  Concatenates two strings.

- ds_str ds_str_concat_cstr (ds_str dst, const char ∗src)

  Concatenates a C-style string to a string.

- ds_str ds_str_trunc (ds_str str, const size_t length)

  Truncates a string.

- unsigned long ds_str_hash (ds_str str)

  Calculates a hash of a string.

- int ds_str_compare (ds_str s1, ds_str s2)

  Compares two strings.

- int ds_str_compare_cstr (ds_str s1, const char ∗s2)

  Compares a string with a C-style string.

- int ds_str_strchr (ds_str str, const char ch, const int start)

  Returns index of first occurence of a character.

- ds_str ds_str_substr_left (ds_str str, const size_t numchars)

  Returns a left substring.

- ds_str ds_str_substr_right (ds_str str, const size_t numchars)

  Returns a right substring.

- void ds_str_split (ds_str src, ds_str ∗left, ds_str ∗right, const char sc)

  Splits a string.

- void ds_str_trim_leading (ds_str str)

  Trims leading whitespace in-place.

- void ds_str_trim_trailing (ds_str str)

  Trims trailing whitespace in-place.

- void ds_str_trim (ds_str str)

  Trims leading and trailing whitespace in-place.

- char ds_str_char_at_index (ds_str str, const size_t index)

  Returns the character at a specified index.

- bool ds_str_is_empty (ds_str str)

  Checks if a string is empty.

- void ds_str_clear (ds_str str)

  Clears (empties) a string.

- bool ds_str_intval (ds_str str, const int base, int ∗value)

  Gets the integer value of a string.

- bool ds_str_doubleval (ds_str str, double ∗value)

  Gets the double value of a string.

- ds_str ds_str_getline (ds_str str, const size_t size, FILE ∗fp)

  Gets a line from a file and assigns it to a string.

- ds_str ds_str_decorate (ds_str str, ds_str left_dec, ds_str right_dec)

  Brackets a string with decoration strings.

4.43.1 Detailed Description

Implementation of string data structure.

Author

Paul Griffiths

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4.43.2 Function Documentation

4.43.2.1 ds_str ds_str_assign (ds_str *dst*, ds_str *src*)

Assigns a string to another.

Parameters

dst	The destination string.
src	The source string.

Returns

`dst` on success, `NULL` on failure.

4.43.2.2 ds_str ds_str_assign_cstr (ds_str *dst*, const char ∗ *src*)

Assigns a C-style string to a string.

Parameters

dst	The destination string.
src	The source C-style string.

Returns

`dst` on success, `NULL` on failure.

4.43.2.3 char ds_str_char_at_index (ds_str *str*, const size_t *index*)

Returns the character at a specified index.

Parameters

str	The string.
index	The specified index.

Returns

The character at the specified index.

4.43.2.4 void ds_str_clear (ds_str *str*)

Clears (empties) a string.

Parameters

str	The string.

4.43.2.5 int ds_str_compare (ds_str *s1*, ds_str *s2*)

Compares two strings.

Parameters

s1	The first string.
s2	The second string.

Returns

Less than, equal to, or greater than zero if s1 is found, respectively, to be less than, equal to, or greater than s2.

4.43.2.6 int ds_str_compare_cstr (ds_str *s1*, const char * *s2*)

Compares a string with a C-style string.

Parameters

s1	The first string.
s2	The second, C-Style string.

Returns

Less than, equal to, or greater than zero if s1 is found, respectively, to be less than, equal to, or greater than s2.

4.43.2.7 ds_str ds_str_concat (ds_str *dst*, ds_str *src*)

Concatenates two strings.

Parameters

dst	The destination string.
src	The source strings.

Returns

The destination string, or `NULL` on failure.

4.43.2.8 ds_str ds_str_concat_cstr (ds_str *dst*, const char * *src*)

Concatenates a C-style string to a string.

Parameters

dst	The destination string.
src	The source strings.

Returns

The destination string, or `NULL` on failure.

4.43.2.9 ds_str ds_str_create (const char ∗ *init_str*)

Creates a new string from a C-style string.

Parameters

init_str	The C-style string.

Returns

The new string, or `NULL` on failure.

4.43.2.10 ds_str ds_str_create_direct (char ∗ *init_str,* const size_t *init_str_size*)

Creates a string using allocated memory.

The normal construction functions duplicate the string used to create it. In cases where allocated memory is already available (e.g. in `ds_str_create_sprintf()`) this function allows that memory to be directly assigned to the string, avoiding an unnecessary duplication.

Parameters

init_str	The allocated memory. IMPORTANT: If the construction of the string fails, this memory will be `free()`d.
init_str_size	The size of the allocated memory. IMPORTANT: The string's length is assumed to be one less than this quantity, and a call to `strlen()` is NOT performed.

Returns

The new string, or `NULL` on failure.

4.43.2.11 ds_str ds_str_create_sprintf (const char ∗ *format, ...*)

Creates a string with `sprintf()`-type format.

Parameters

format	The format string.
...	The subsequent arguments as specified by the format string.

Returns

The new string, or `NULL` on failure.

4.43.2.12 const char∗ ds_str_cstr (ds_str *str*)

Returns a C-style string containing the string's contents.

Parameters

str	The string.

Returns

The C-style string containing the string's contents. The caller should not directly modify this string.

4.43.2.13 ds_str ds_str_decorate (ds_str *str*, ds_str *left_dec*, ds_str *right_dec*)

Brackets a string with decoration strings.

Parameters

str	The string to decorate.
left_dec	The string to add to the left of `str`.
right_dec	The string to add to the right of `str`, or `NULL` to add `left_dec` to both sides.

Returns

The decorated string.

4.43.2.14 void ds_str_destroy (ds_str *str*)

Destroys a string and releases allocated resources.

Parameters

str	The string to destroy..

4.43.2.15 void ds_str_destructor (void ∗ *str*)

Destroys a string and releases allocated resources.

This function calls `ds_str_destroy()`, and can be passed to a data structure expecting a destructor function with the signature void (∗)(void ∗).

Parameters

str	The string to destroy.

4.43.2.16 bool ds_str_doubleval (ds_str *str*, double ∗ *value*)

Gets the double value of a string.

Parameters

str	The string.
value	A pointer to the double in which to store the value. Zero is stored if the string does not contain a valid double value.

Returns

`true` on successful conversion, `false` if the string does not contain a valid double value.

4.43.2.17 ds_str ds_str_dup (ds_str *src*)

Creates a new string from another string.

Parameters

src	The other string.

Returns

The new string, or `NULL` on failure.

4.43.2.18 ds_str ds_str_getline (ds_str *str,* const size_t *size,* FILE ∗ *fp*)

Gets a line from a file and assigns it to a string.

Any trailing newline character is stripped.

Parameters

str	The string.
size	The maximum number of bytes to read, including the null.
fp	The file pointer from which to read.

Returns

`dst`

4.43.2.19 unsigned long ds_str_hash (ds_str *str*)

Calculates a hash of a string.

Uses Dan Bernstein's djb2 algorithm.

Parameters

str	The string.

Returns

The hash value

4.43.2.20 bool ds_str_intval (ds_str *str,* const int *base,* int ∗ *value*)

Gets the integer value of a string.

Parameters

str	The string.
base	The base of the integer. This has the same meaning as the third argument to standard C `strtol()`.

value	A pointer to the integer in which to store the value. Zero is stored if the string does not contain a valid integer value.

Returns

`true` on successful conversion, `false` if the string does not contain a valid integer value.

4.43.2.21 bool ds_str_is_empty (ds_str *str*)

Checks if a string is empty.

Parameters

str	The string.

Returns

`true` is the string is empty, `false` otherwise.

4.43.2.22 size_t ds_str_length (ds_str *str*)

Returns the length of a string.

Parameters

str	The string.

Returns

The length of the string.

4.43.2.23 ds_str ds_str_size_to_fit (ds_str *str*)

Reduces a string's capacity to fit its length.

Parameters

str	The string to size.

Returns

`str`, or `NULL` on failure.

4.43.2.24 void ds_str_split (ds_str *src*, ds_str ∗ *left*, ds_str ∗ *right*, const char *sc*)

Splits a string.

Parameters

src	The string to split.
left	Pointer to left substring (modified)
right	Pointer to right substring (modified)
sc	Split character.

4.43.2.25 int ds_str_strchr (ds_str *str*, const char *ch*, const int *start*)

Returns index of first occurence of a character.

Parameters

str	The string.
ch	The character for which to search.
start	The index of the string at which to start looking. Set this to non-zero to begin searching from a point other than the first character of the string.

Returns

The index of the first occurence, or -1 if the character was not found.

4.43.2.26 ds_str ds_str_substr_left (ds_str *str*, const size_t *numchars*)

Returns a left substring.

Parameters

str	The string.
numchars	The number of left characters to return. If this is greater than the length of the string, the whole string is returned.

Returns

A new string representing the substring.

4.43.2.27 ds_str ds_str_substr_right (ds_str *str*, const size_t *numchars*)

Returns a right substring.

Parameters

str	The string.
numchars	The number of right characters to return. If this is greater than the length of the string, the whole string is returned.

Returns

A new string representing the substring.

4.43.2.28 void ds_str_trim (ds_str *str*)

Trims leading and trailing whitespace in-place.

Parameters

str	The string.

4.43.2.29 void ds_str_trim_leading (**ds_str** *str*)

Trims leading whitespace in-place.

Parameters

str	The string.

4.43.2.30 void ds_str_trim_trailing (**ds_str** *str*)

Trims trailing whitespace in-place.

Parameters

str	The string.

4.43.2.31 **ds_str** ds_str_trunc (**ds_str** *str*, const size_t *length*)

Truncates a string.

Parameters

str	The string.
length	The new length to which to truncate.

Returns

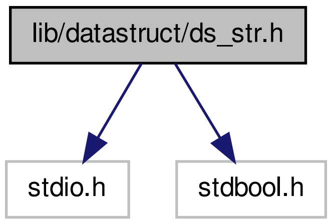
The original string, or `NULL` on failure.

4.44 lib/datastruct/ds_str.h File Reference

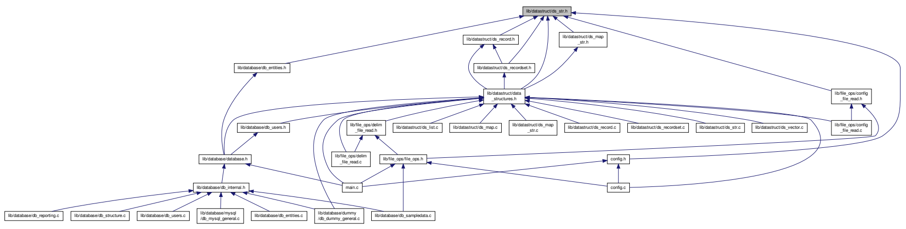
Interface to string data structure.

```
#include <stdio.h>
#include <stdbool.h>
```

Include dependency graph for ds_str.h:



This graph shows which files directly or indirectly include this file:


lib/datastruct/ds_str.h
lib/datastruct/ds_record.h
lib/datastruct/ds_map_str.h
lib/database/db_entities.h
lib/datastruct/ds_recordset.h
lib/datastruct/data_structures.h
lib/file_ops/config_file_read.h
lib/database/db_users.h
lib/file_ops/delim_file_read.h
lib/datastruct/ds_list.c
lib/datastruct/ds_map.c
lib/datastruct/ds_map_str.c
lib/datastruct/ds_record.c
lib/datastruct/ds_recordset.c
lib/datastruct/ds_str.c
lib/datastruct/ds_vector.c
lib/file_ops/config_file_read.c
lib/database/database.h
lib/file_ops/delim_file_read.c
lib/file_ops/file_ops.h
config.h
lib/database/db_internal.h
main.c
config.c
lib/database/db_reporting.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/mysql/db_mysql_general.c
lib/database/db_entities.c
lib/database/dummy/db_dummy_general.c
lib/database/db_sampledata.c

Typedefs

- typedef struct ds_str ∗ ds_str

Functions

- ds_str ds_str_create (const char ∗init_str)

  Creates a new string from a C-style string.
- ds_str ds_str_dup (ds_str src)

  Creates a new string from another string.
- ds_str ds_str_create_sprintf (const char ∗format,...)

  Creates a string with `sprintf()`-type format.
- ds_str ds_str_create_direct (char ∗init_str, const size_t init_str_size)

  Creates a string using allocated memory.
- void ds_str_destroy (ds_str str)

  Destroys a string and releases allocated resources.
- void ds_str_destructor (void ∗str)

  Destroys a string and releases allocated resources.
- ds_str ds_str_assign (ds_str dst, ds_str src)

  Assigns a string to another.
- ds_str ds_str_assign_cstr (ds_str dst, const char ∗src)

  Assigns a C-style string to a string.
- const char ∗ ds_str_cstr (ds_str str)

  Returns a C-style string containing the string's contents.
- size_t ds_str_length (ds_str str)

  Returns the length of a string.
- ds_str ds_str_size_to_fit (ds_str str)

  Reduces a string's capacity to fit its length.
- ds_str ds_str_concat (ds_str dst, ds_str src)

  Concatenates two strings.
- ds_str ds_str_concat_cstr (ds_str dst, const char ∗src)

  Concatenates a C-style string to a string.
- ds_str ds_str_trunc (ds_str str, const size_t length)

  Truncates a string.
- unsigned long ds_str_hash (ds_str str)

  Calculates a hash of a string.
- int ds_str_compare (ds_str s1, ds_str s2)

  Compares two strings.
- int ds_str_compare_cstr (ds_str s1, const char ∗s2)

  Compares a string with a C-style string.

- int ds_str_strchr (ds_str str, const char ch, const int start)

  Returns index of first occurence of a character.
- ds_str ds_str_substr_left (ds_str str, const size_t numchars)

  Returns a left substring.
- ds_str ds_str_substr_right (ds_str str, const size_t numchars)

  Returns a right substring.
- void ds_str_split (ds_str src, ds_str ∗left, ds_str ∗right, const char sc)

  Splits a string.
- void ds_str_trim_leading (ds_str str)

  Trims leading whitespace in-place.
- void ds_str_trim_trailing (ds_str str)

  Trims trailing whitespace in-place.
- void ds_str_trim (ds_str str)

  Trims leading and trailing whitespace in-place.
- char ds_str_char_at_index (ds_str str, const size_t index)

  Returns the character at a specified index.
- bool ds_str_is_empty (ds_str str)

  Checks if a string is empty.
- void ds_str_clear (ds_str str)

  Clears (empties) a string.
- bool ds_str_intval (ds_str str, const int base, int ∗value)

  Gets the integer value of a string.
- bool ds_str_doubleval (ds_str str, double ∗value)

  Gets the double value of a string.
- ds_str ds_str_getline (ds_str str, const size_t size, FILE ∗fp)

  Gets a line from a file and assigns it to a string.
- ds_str ds_str_decorate (ds_str str, ds_str left_dec, ds_str right_dec)

  Brackets a string with decoration strings.

4.44.1 Detailed Description

Interface to string data structure.

Author

Paul Griffiths

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4.44.2 Typedef Documentation

4.44.2.1 typedef struct ds_str∗ ds_str

Opaque data type for string

4.44.3 Function Documentation

4.44.3.1 ds_str ds_str_assign (ds_str *dst,* ds_str *src*)

Assigns a string to another.

Parameters

dst	The destination string.
src	The source string.

Returns

`dst` on success, `NULL` on failure.

4.44.3.2 ds_str ds_str_assign_cstr (ds_str *dst,* const char ∗ *src*)

Assigns a C-style string to a string.

Parameters

dst	The destination string.
src	The source C-style string.

Returns

`dst` on success, `NULL` on failure.

4.44.3.3 char ds_str_char_at_index (ds_str *str,* const size_t *index*)

Returns the character at a specified index.

Parameters

str	The string.
index	The specified index.

Returns

The character at the specified index.

4.44.3.4 void ds_str_clear (ds_str *str*)

Clears (empties) a string.

Parameters

str	The string.

4.44.3.5 int ds_str_compare (ds_str *s1,* ds_str *s2*)

Compares two strings.

Parameters

s1	The first string.
s2	The second string.

Returns

Less than, equal to, or greater than zero if s1 is found, respectively, to be less than, equal to, or greater than s2.

4.44.3.6 int ds_str_compare_cstr (ds_str *s1*, const char ∗ *s2*)

Compares a string with a C-style string.

Parameters

s1	The first string.
s2	The second, C-Style string.

Returns

Less than, equal to, or greater than zero if s1 is found, respectively, to be less than, equal to, or greater than s2.

4.44.3.7 ds_str ds_str_concat (ds_str *dst*, ds_str *src*)

Concatenates two strings.

Parameters

dst	The destination string.
src	The source strings.

Returns

The destination string, or `NULL` on failure.

4.44.3.8 ds_str ds_str_concat_cstr (ds_str *dst*, const char ∗ *src*)

Concatenates a C-style string to a string.

Parameters

dst	The destination string.
src	The source strings.

Returns

The destination string, or `NULL` on failure.

4.44.3.9 ds_str ds_str_create (const char ∗ *init_str*)

Creates a new string from a C-style string.

Parameters

init_str	The C-style string.

Returns

The new string, or `NULL` on failure.

4.44.3.10 ds_str ds_str_create_direct (char * *init_str,* const size_t *init_str_size*)

Creates a string using allocated memory.

The normal construction functions duplicate the string used to create it. In cases where allocated memory is already available (e.g. in `ds_str_create_sprintf()`) this function allows that memory to be directly assigned to the string, avoiding an unnecessary duplication.

Parameters

init_str	The allocated memory. IMPORTANT: If the construction of the string fails, this memory will be `free()`d.
init_str_size	The size of the allocated memory. IMPORTANT: The string's length is assumed to be one less than this quantity, and a call to `strlen()` is NOT performed.

Returns

The new string, or `NULL` on failure.

4.44.3.11 ds_str ds_str_create_sprintf (const char * *format,* ...)

Creates a string with `sprintf()`-type format.

Parameters

format	The format string.
...	The subsequent arguments as specified by the format string.

Returns

The new string, or `NULL` on failure.

4.44.3.12 const char* ds_str_cstr (ds_str *str*)

Returns a C-style string containing the string's contents.

Parameters

str	The string.

Returns

The C-style string containing the string's contents. The caller should not directly modify this string.

4.44.3.13 ds_str ds_str_decorate (ds_str *str,* ds_str *left_dec,* ds_str *right_dec*)

Brackets a string with decoration strings.

Parameters

str	The string to decorate.
left_dec	The string to add to the left of `str`.
right_dec	The string to add to the right of `str`, or `NULL` to add `left_dec` to both sides.

Returns

The decorated string.

4.44.3.14 void ds_str_destroy (ds_str *str*)

Destroys a string and releases allocated resources.

Parameters

str	The string to destroy..

4.44.3.15 void ds_str_destructor (void ∗ *str*)

Destroys a string and releases allocated resources.

This function calls `ds_str_destroy()`, and can be passed to a data structure expecting a destructor function with the signature void (∗)(void ∗).

Parameters

str	The string to destroy.

4.44.3.16 bool ds_str_doubleval (ds_str *str,* double ∗ *value*)

Gets the double value of a string.

Parameters

str	The string.
value	A pointer to the double in which to store the value. Zero is stored if the string does not contain a valid double value.

Returns

`true` on successful conversion, `false` if the string does not contain a valid double value.

4.44.3.17 ds_str ds_str_dup (ds_str *src*)

Creates a new string from another string.

Parameters

src	The other string.

Returns

The new string, or `NULL` on failure.

4.44.3.18 ds_str ds_str_getline (ds_str *str,* const size_t *size,* FILE ∗ *fp*)

Gets a line from a file and assigns it to a string.

Any trailing newline character is stripped.

Parameters

str	The string.
size	The maximum number of bytes to read, including the null.
fp	The file pointer from which to read.

Returns

`dst`

4.44.3.19 unsigned long ds_str_hash (ds_str *str*)

Calculates a hash of a string.

Uses Dan Bernstein's djb2 algorithm.

Parameters

str	The string.

Returns

The hash value

4.44.3.20 bool ds_str_intval (ds_str *str,* const int *base,* int ∗ *value*)

Gets the integer value of a string.

Parameters

str	The string.
base	The base of the integer. This has the same meaning as the third argument to standard C `strtol()`.
value	A pointer to the integer in which to store the value. Zero is stored if the string does not contain a valid integer value.

Returns

`true` on successful conversion, `false` if the string does not contain a valid integer value.

4.44.3.21 bool ds_str_is_empty (**ds_str** *str*)

Checks if a string is empty.

Parameters

str	The string.

Returns

`true` is the string is empty, `false` otherwise.

4.44.3.22 size_t ds_str_length (**ds_str** *str*)

Returns the length of a string.

Parameters

str	The string.

Returns

The length of the string.

4.44.3.23 **ds_str** ds_str_size_to_fit (**ds_str** *str*)

Reduces a string's capacity to fit its length.

Parameters

str	The string to size.

Returns

`str`, or `NULL` on failure.

4.44.3.24 void ds_str_split (**ds_str** *src,* **ds_str** $*$ *left,* **ds_str** $*$ *right,* const char *sc*)

Splits a string.

Parameters

src	The string to split.
left	Pointer to left substring (modified)
right	Pointer to right substring (modified)
sc	Split character.

4.44.3.25 int ds_str_strchr (**ds_str** *str,* const char *ch,* const int *start*)

Returns index of first occurence of a character.

Parameters

str	The string.
ch	The character for which to search.
start	The index of the string at which to start looking. Set this to non-zero to begin searching from a point other than the first character of the string.

Returns

The index of the first occurence, or -1 if the character was not found.

4.44.3.26 ds_str ds_str_substr_left (ds_str *str,* const size_t *numchars*)

Returns a left substring.

Parameters

str	The string.
numchars	The number of left characters to return. If this is greater than the length of the string, the whole string is returned.

Returns

A new string representing the substring.

4.44.3.27 ds_str ds_str_substr_right (ds_str *str,* const size_t *numchars*)

Returns a right substring.

Parameters

str	The string.
numchars	The number of right characters to return. If this is greater than the length of the string, the whole string is returned.

Returns

A new string representing the substring.

4.44.3.28 void ds_str_trim (ds_str *str*)

Trims leading and trailing whitespace in-place.

Parameters

str	The string.

4.44.3.29 void ds_str_trim_leading (ds_str *str*)

Trims leading whitespace in-place.

Parameters

str	The string.

4.44.3.30 void ds_str_trim_trailing (**ds_str** *str*)

Trims trailing whitespace in-place.

Parameters

str	The string.

4.44.3.31 **ds_str** ds_str_trunc (**ds_str** *str,* const size_t *length*)

Truncates a string.

Parameters

str	The string.
length	The new length to which to truncate.

Returns

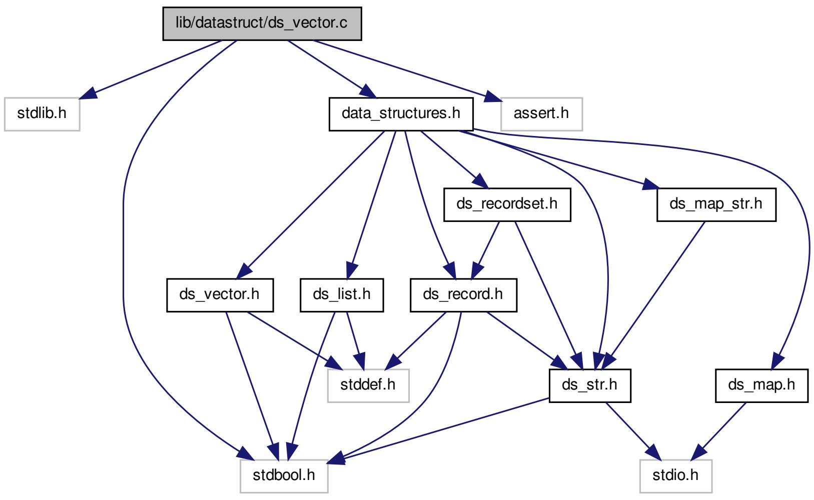
The original string, or `NULL` on failure.

4.45 lib/datastruct/ds_vector.c File Reference

Implementation of generic doubly-linked vector data structure.

```
#include <stdlib.h>
#include <stdbool.h>
#include <assert.h>
#include "data_structures.h"
```

Include dependency graph for ds_vector.c:



Data Structures

- struct ds_vector

Functions

- ds_vector ds_vector_create (const size_t size, const bool free_on_delete, void(∗destructor)(void ∗))

  Creates a new vector.
- void ds_vector_destroy (ds_vector vector)

  Destroys a vector and frees any associated resources.
- void ds_vector_destructor (void ∗vector)

  A vector destructor function.
- void ds_vector_clear (ds_vector vector)

  Clears all the elements in a vector.
- void ds_vector_set (ds_vector vector, const size_t index, void ∗element)

  Sets an element of a vector.
- void ∗ ds_vector_element (ds_vector vector, const size_t index)

  Retrieves the data at a specified index.
- size_t ds_vector_size (ds_vector vector)

  Returns the size of a vector.
- void ds_vector_seek_start (ds_vector vector)

  Sets the current element to the first element of a vector.
- void ∗ ds_vector_get_next_data (ds_vector vector)

  Returns the next element of the vector.

4.45.1 Detailed Description

Implementation of generic doubly-linked vector data structure.

Author

Paul Griffiths

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4.45.2 Function Documentation

4.45.2.1 void ds_vector_clear (ds_vector *vector*)

Clears all the elements in a vector.

If the vector was created with `free_on_delete`, the elements are `free()`d prior to being cleared (i.e. set to `NULL`).

Parameters

vector	The vector.

4.45.2.2 ds_vector ds_vector_create (const size_t *size*, const bool *free_on_delete*, void(∗)(void ∗) *destructor*)

Creates a new vector.

Parameters

size	The size of the vector.
free_on_delete	Set to `true` if the vector elements should be destroyed when removed from the vector, and when the vector itself is destroyed. If set to `false`, the caller is responsible for destroying the elements prior to destroying the vector.
destructor	Pointer to a destructor function to use for destroying the vector elements, when `free_on_delete` is true. If this is set to `NULL`, `free()` from the standard C library will be used to destroy the elements.

Returns

A newly created vector, or `NULL` on failure.

4.45.2.3 void ds_vector_destroy (ds_vector *vector*)

Destroys a vector and frees any associated resources.

Parameters

vector	The vector to destroy.

4.45.2.4 void ds_vector_destructor (void ∗ *vector*)

A vector destructor function.

This function may be passed to `ds_vector_create()` when creating a vector of vectors. It calls `ds_vector_destroy()`, but the parameter of `ds_vector_destroy()` is not compatible with the function signature expected by `ds_vector_create()`, so this function provides an appropriate interface.

Parameters

vector	The vector to destroy.

4.45.2.5 void∗ ds_vector_element (ds_vector *vector*, const size_t *index*)

Retrieves the data at a specified index.

Parameters

vector	The vector from which to retrieve.
index	The index of the desired element.

Returns

A pointer to the data, or `NULL` if the index is out of range.

4.45.2.6 void∗ ds_vector_get_next_data (ds_vector *vector*)

Returns the next element of the vector.

This function returns the data of the "current element", and advances the current element pointer. Subsequent calls to this function will return successive elements.

Parameters

vector	The vector.

Returns

A pointer to the next element, or `NULL` if the end of the vector has been reached.

4.45.2.7 void ds_vector_seek_start (ds_vector *vector*)

Sets the current element to the first element of a vector.

Parameters

vector	The vector.

4.45.2.8 void ds_vector_set (ds_vector *vector,* const size_t *index,* void ∗ *element*)

Sets an element of a vector.

If the element is currently occupied, the existing element is `free()` d.

Parameters

vector	The vector to which to set.
index	The index of the element to set.
element	The element to set.

4.45.2.9 size_t ds_vector_size (ds_vector *vector*)

Returns the size of a vector.

Parameters

vector	The vector.

Returns

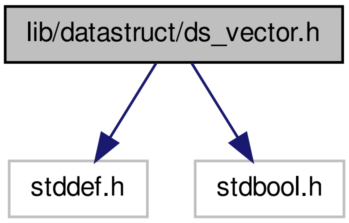
The size of the vector.

4.46 lib/datastruct/ds_vector.h File Reference

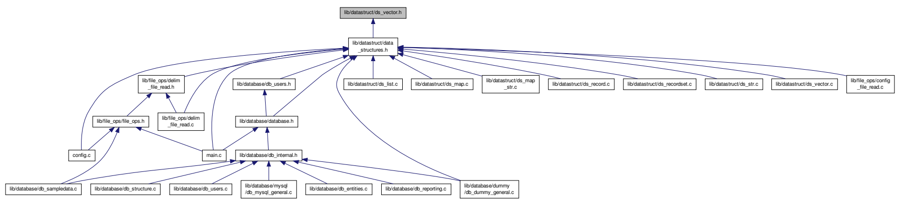
Interface to generic doubly-linked vector data structure.

```
#include <stddef.h>
#include <stdbool.h>
```

Include dependency graph for ds_vector.h:



This graph shows which files directly or indirectly include this file:


lib/datastruct/ds_vector.h
lib/datastruct/data_structures.h
lib/file_ops/delim_file_read.h
lib/database/db_users.h
lib/datastruct/ds_list.c
lib/datastruct/ds_map.c
lib/datastruct/ds_map_str.c
lib/datastruct/ds_record.c
lib/datastruct/ds_recordset.c
lib/datastruct/ds_str.c
lib/datastruct/ds_vector.c
lib/file_ops/config_file_read.c
lib/file_ops/file_ops.h
lib/file_ops/delim_file_read.c
lib/database/database.h
config.c
main.c
lib/database/db_internal.h
lib/database/db_sampledata.c
lib/database/db_structure.c
lib/database/db_users.c
lib/database/mysql/db_mysql_general.c
lib/database/db_entities.c
lib/database/db_reporting.c
lib/database/dummy/db_dummy_general.c

Typedefs

- typedef struct ds_vector ∗ ds_vector

Functions

- ds_vector ds_vector_create (const size_t size, const bool free_on_delete, void(∗destructor)(void ∗))

  Creates a new vector.
- void ds_vector_destroy (ds_vector vector)

  Destroys a vector and frees any associated resources.
- void ds_vector_destructor (void ∗vector)

  A vector destructor function.
- void ds_vector_clear (ds_vector vector)

  Clears all the elements in a vector.
- void ds_vector_set (ds_vector vector, const size_t index, void ∗element)

  Sets an element of a vector.

- void ∗ ds_vector_element (ds_vector vector, const size_t index)

    Retrieves the data at a specified index.
- size_t ds_vector_size (ds_vector vector)

    Returns the size of a vector.
- void ds_vector_seek_start (ds_vector vector)

    Sets the current element to the first element of a vector.
- void ∗ ds_vector_get_next_data (ds_vector vector)

    Returns the next element of the vector.

4.46.1 Detailed Description

Interface to generic doubly-linked vector data structure.

Author

Paul Griffiths

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4.46.2 Typedef Documentation

4.46.2.1 typedef struct **ds_vector**∗ **ds_vector**

Typedef for opaque vector datatype

4.46.3 Function Documentation

4.46.3.1 void ds_vector_clear (**ds_vector** *vector*)

Clears all the elements in a vector.

If the vector was created with `free_on_delete`, the elements are `free()`d prior to being cleared (i.e. set to `NULL`).

Parameters

vector	The vector.

4.46.3.2 **ds_vector** ds_vector_create (const size_t *size*, const bool *free_on_delete*, void(∗)(void ∗) *destructor*)

Creates a new vector.

Parameters

size	The size of the vector.
free_on_delete	Set to `true` if the vector elements should be destroyed when removed from the vector, and when the vector itself is destroyed. If set to `false`, the caller is responsible for destroying the elements prior to destroying the vector.
destructor	Pointer to a destructor function to use for destroying the vector elements, when `free_on_delete` is true. If this is set to `NULL`, `free()` from the standard C library will be used to destroy the elements.

Returns

A newly created vector, or `NULL` on failure.

4.46.3.3 void ds_vector_destroy (ds_vector *vector*)

Destroys a vector and frees any associated resources.

Parameters

vector	The vector to destroy.

4.46.3.4 void ds_vector_destructor (void ∗ *vector*)

A vector destructor function.

This function may be passed to `ds_vector_create()` when creating a vector of vectors. It calls `ds_vector_destroy()`, but the parameter of `ds_vector_destroy()` is not compatible with the function signature expected by `ds_vector_create()`, so this function provides an appropriate interface.

Parameters

vector	The vector to destroy.

4.46.3.5 void∗ ds_vector_element (ds_vector *vector,* const size_t *index*)

Retrieves the data at a specified index.

Parameters

vector	The vector from which to retrieve.
index	The index of the desired element.

Returns

A pointer to the data, or `NULL` if the index is out of range.

4.46.3.6 void∗ ds_vector_get_next_data (ds_vector *vector*)

Returns the next element of the vector.

This function returns the data of the "current element", and advances the current element pointer. Subsequent calls to this function will return successive elements.

Parameters

vector	The vector.

Returns

A pointer to the next element, or `NULL` if the end of the vector has been reached.

4.46.3.7 void ds_vector_seek_start (ds_vector *vector*)

Sets the current element to the first element of a vector.

Parameters

vector	The vector.

4.46.3.8 void ds_vector_set (ds_vector *vector,* const size_t *index,* void ∗ *element*)

Sets an element of a vector.

If the element is currently occupied, the existing element is `free()`d.

Parameters

vector	The vector to which to set.
index	The index of the element to set.
element	The element to set.

4.46.3.9 size_t ds_vector_size (ds_vector *vector*)

Returns the size of a vector.

Parameters

vector	The vector.

Returns

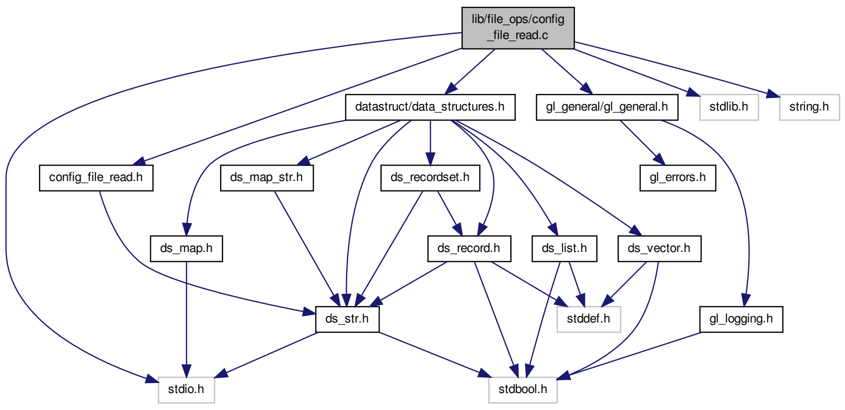
The size of the vector.

4.47 lib/file_ops/config_file_read.c File Reference

Implementation of configuration file reading functionality.

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "gl_general/gl_general.h"
#include "datastruct/data_structures.h"
#include "config_file_read.h"
```

Include dependency graph for config_file_read.c:



Macros

- #define MAX_BUFFER_SIZE 1024
- #define CONFIG_MAP_SIZE 100

Functions

- int config_file_read (const char ∗filename)

  Reads a configuration file and stores the key-value pairs.
- ds_str config_file_value (ds_str key)

  Returns the value associated with a key.
- void config_file_free (void)

  Frees the resources used by this module.

4.47.1 Detailed Description

Implementation of configuration file reading functionality. This module reads configuration files in the format "key = value" and makes those values available. Leading and trailing whitespace is removed for both the key and the value. Blank lines and lines starting with a '#' are ignored in the configuration file.

Author

Paul Griffiths

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4.47.2 Macro Definition Documentation

4.47.2.1 #define CONFIG_MAP_SIZE 100

Size to use for the hash map to contain the key-value pairs

4.47.2.2 #define MAX_BUFFER_SIZE 1024

Maximum size of buffers

4.47.3 Function Documentation

4.47.3.1 void config_file_free (void)

Frees the resources used by this module.

The user should make copies of any required keys or values prior to calling this function. This function need not be called if `config_file_read()` returned an error.

4.47.3.2 int config_file_read (const char ∗ *filename*)

Reads a configuration file and stores the key-value pairs.

Parameters

filename	The name of the configuration file.

Returns

CONFIG_FILE_OK on success, CONFIG_FILE_NO_FILE if the specified file could not be opened for reading, CONFIG_FILE_MALFORMED_FILE if the configuration file was improperly formed.

4.47.3.3 ds_str config_file_value (ds_str *key*)

Returns the value associated with a key.

Parameters

key	The specified key.

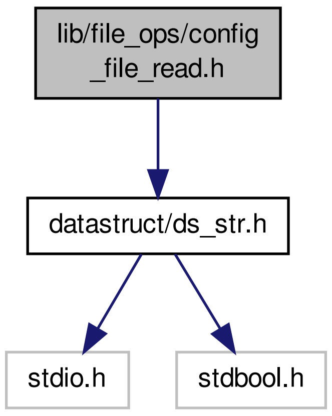
Returns

A pointer to the associated value, or `NULL` if the key was not present in the configuration file. The caller should not modify the string to which the pointer points.

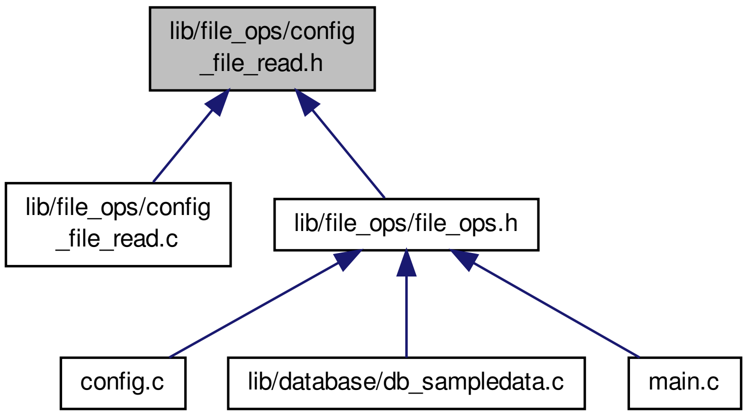
4.48 lib/file_ops/config_file_read.h File Reference

Interface to configuration file reading functionality.

`#include "datastruct/ds_str.h"`
Include dependency graph for config_file_read.h:



This graph shows which files directly or indirectly include this file:



Macros

- #define CONFIG_FILE_OK 0
- #define CONFIG_FILE_NO_FILE 1
- #define CONFIG_FILE_MALFORMED_FILE 2

Functions

- int config_file_read (const char ∗filename)

Reads a configuration file and stores the key-value pairs.
- void config_file_free (void)

  Frees the resources used by this module.
- ds_str config_file_value (ds_str key)

  Returns the value associated with a key.

4.48.1 Detailed Description

Interface to configuration file reading functionality. This module reads configuration files in the format "key = value" and makes those values available. Leading and trailing whitespace is removed for both the key and the value. Blank lines and lines starting with a '#' are ignored in the configuration file.

Author

Paul Griffiths

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4.48.2 Macro Definition Documentation

4.48.2.1 #define CONFIG_FILE_MALFORMED_FILE 2

Return status when configuration file is improperly formed

4.48.2.2 #define CONFIG_FILE_NO_FILE 1

Return status when unable to open file for reading

4.48.2.3 #define CONFIG_FILE_OK 0

Return status for success

4.48.3 Function Documentation

4.48.3.1 void config_file_free (void)

Frees the resources used by this module.

The user should make copies of any required keys or values prior to calling this function. This function need not be called if `config_file_read()` returned an error.

4.48.3.2 int config_file_read (const char ∗ *filename*)

Reads a configuration file and stores the key-value pairs.

Parameters

filename	The name of the configuration file.

Returns

CONFIG_FILE_OK on success, CONFIG_FILE_NO_FILE if the specified file could not be opened for reading, CONFIG_FILE_MALFORMED_FILE if the configuration file was improperly formed.

4.48.3.3 ds_str config_file_value (ds_str *key*)

Returns the value associated with a key.

Parameters

key	The specified key.

Returns

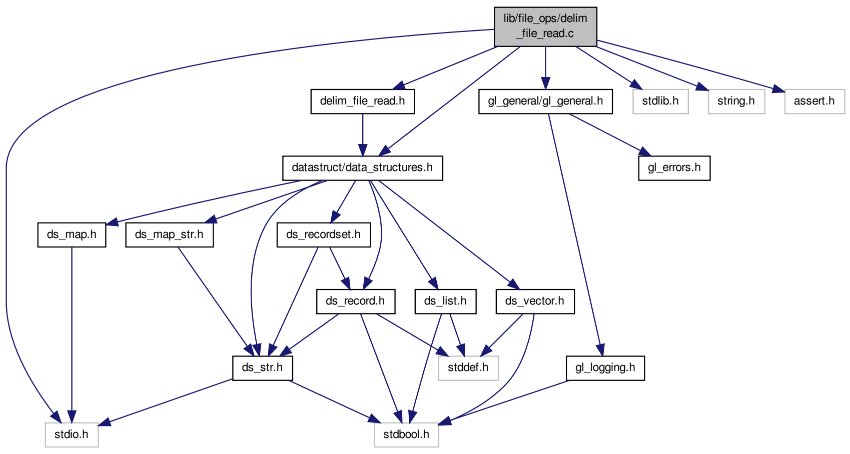
A pointer to the associated value, or `NULL` if the key was not present in the configuration file. The caller should not modify the string to which the pointer points.

4.49 lib/file_ops/delim_file_read.c File Reference

Implementation of delimited file reading functionality.

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <assert.h>
#include "gl_general/gl_general.h"
#include "datastruct/data_structures.h"
#include "delim_file_read.h"
```

Include dependency graph for delim_file_read.c:



Macros

- #define MAX_LINE_SIZE 1024

Functions

- ds_recordset delim_file_read (const char ∗filename, const char delim)
  Constructs a ds_recordset from a delimited file.

4.49.1 Detailed Description

Implementation of delimited file reading functionality.

Author

Paul Griffiths

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4.49.2 Macro Definition Documentation

4.49.2.1 #define MAX_LINE_SIZE 1024

Maximum size of buffers

4.49.3 Function Documentation

4.49.3.1 ds_recordset delim_file_read (const char ∗ *filename,* const char *delim*)

Constructs a ds_recordset from a delimited file.

Parameters

filename	The name of the delimited file.
delim	The delimiting character.

Returns

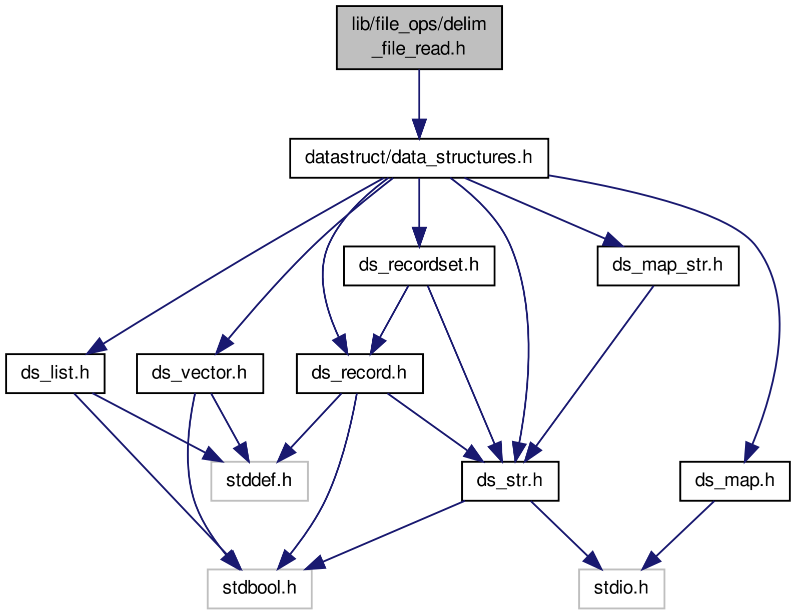
The ds_recordset, or `NULL` on failure.

4.50 lib/file_ops/delim_file_read.h File Reference

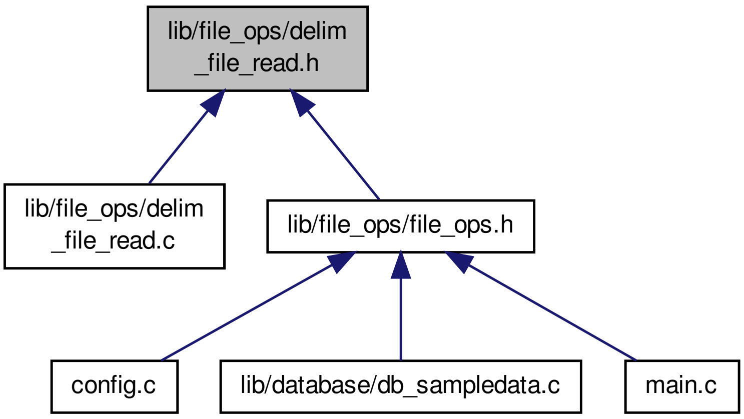
Interface to delimited file reading functionality.

```
#include "datastruct/data_structures.h"
```

Include dependency graph for delim_file_read.h:



This graph shows which files directly or indirectly include this file:



Functions

- ds_recordset delim_file_read (const char ∗filename, const char delim)

    Constructs a ds_recordset from a delimited file.

4.50.1 Detailed Description

Interface to delimited file reading functionality.

Author

Paul Griffiths

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4.50.2 Function Documentation

4.50.2.1 ds_recordset delim_file_read (const char ∗ *filename,* const char *delim*)

Constructs a ds_recordset from a delimited file.

Parameters

filename	The name of the delimited file.
delim	The delimiting character.

Returns

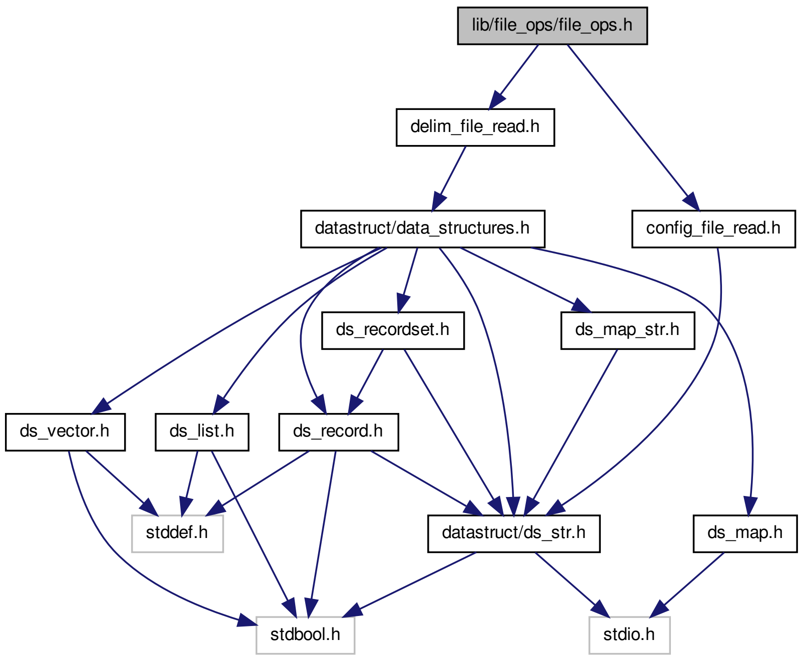
The ds_recordset, or `NULL` on failure.

4.51 lib/file_ops/file_ops.h File Reference

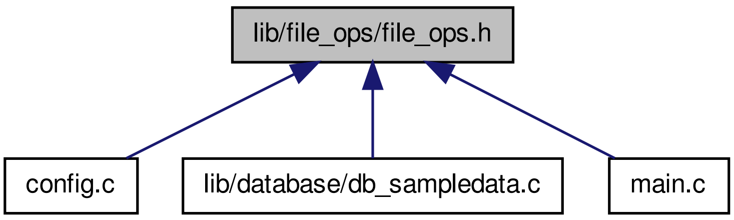
User interface to file operations functionality.

```
#include "config_file_read.h"
#include "delim_file_read.h"
```

Include dependency graph for file_ops.h:



This graph shows which files directly or indirectly include this file:



4.51.1 Detailed Description

User interface to file operations functionality.

Author

Paul Griffiths

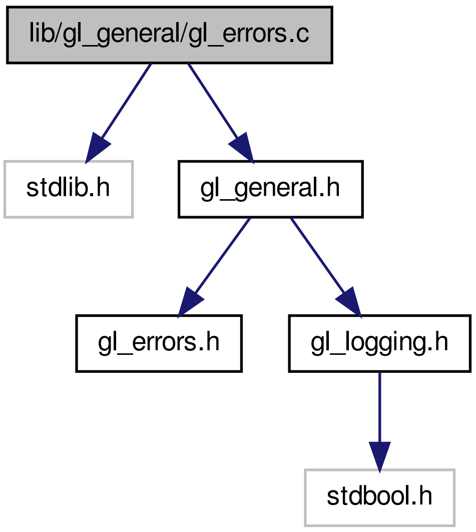
Copyright

4.52 lib/gl_general/gl_errors.c File Reference

Implementation of error functionality.

```
#include <stdlib.h>
#include "gl_general.h"
```

Include dependency graph for gl_errors.c:



Functions

- void gl_error_quit (const char ∗msg)

  Logs an error message and quits program.

4.52.1 Detailed Description

Implementation of error functionality.

Author

Paul Griffiths

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4.52.2 Function Documentation

4.52.2.1 void gl_error_quit (const char ∗ *msg*)

Logs an error message and quits program.

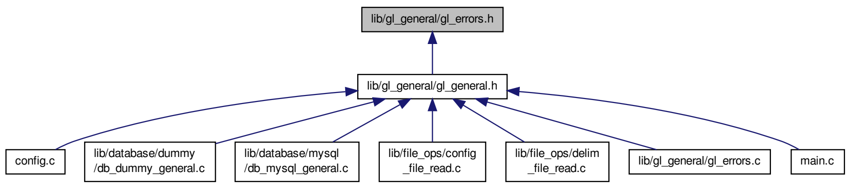
Parameters

msg	The error message to log.

4.53 lib/gl_general/gl_errors.h File Reference

Interface to error functionality.

This graph shows which files directly or indirectly include this file:


lib/gl_general/gl_errors.h
lib/gl_general/gl_general.h
config.c
lib/database/dummy /db_dummy_general.c
lib/database/mysql /db_mysql_general.c
lib/file_ops/config _file_read.c
lib/file_ops/delim _file_read.c
lib/gl_general/gl_errors.c
main.c

Functions

- void gl_error_quit (const char ∗msg)

  Logs an error message and quits program.

4.53.1 Detailed Description

Interface to error functionality.

Author

Paul Griffiths

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4.53.2 Function Documentation

4.53.2.1 void gl_error_quit (const char ∗ *msg*)

Logs an error message and quits program.

Parameters

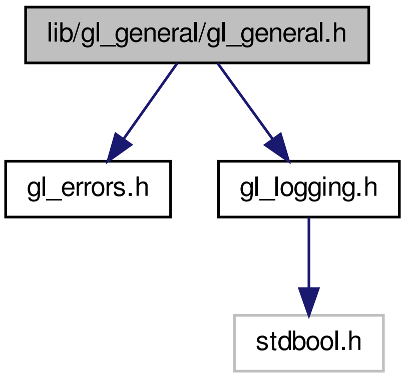
msg	The error message to log.

4.54 lib/gl_general/gl_general.h File Reference

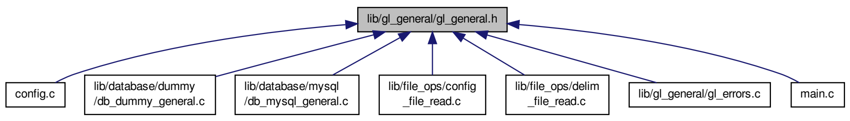
User interface to logging and error functionality.

```
#include "gl_errors.h"
#include "gl_logging.h"
```

Include dependency graph for gl_general.h:



This graph shows which files directly or indirectly include this file:


lib/gl_general/gl_general.h
config.c
lib/database/dummy /db_dummy_general.c
lib/database/mysql /db_mysql_general.c
lib/file_ops/config _file_read.c
lib/file_ops/delim _file_read.c
lib/gl_general/gl_errors.c
main.c

4.54.1 Detailed Description

User interface to logging and error functionality.

Author

Paul Griffiths

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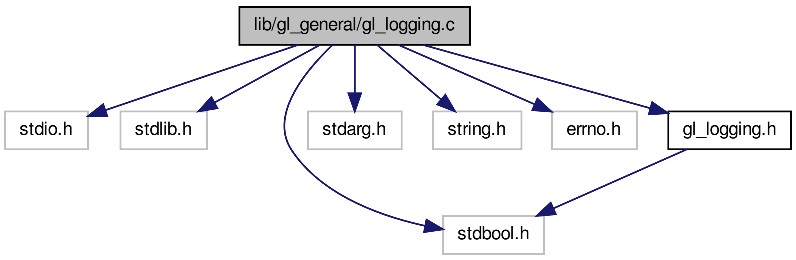
4.55 lib/gl_general/gl_logging.c File Reference

Implementation of logging functionality.

```
#include <stdio.h>
#include <stdlib.h>
#include <stdbool.h>
#include <stdarg.h>
#include <string.h>
#include <errno.h>
#include "gl_logging.h"
```

Include dependency graph for gl_logging.c:



Functions

- void gl_set_logging (const bool status)

  Turns logging on or off.
- void gl_log_msg (const char ∗format,...)

  Logs a message to the log file.

4.55.1 Detailed Description

Implementation of logging functionality. Implementation of logging functionality. Enables debugging and other system messages to be recorded to a log file.

Author

Paul Griffiths

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4.55.2 Function Documentation

4.55.2.1 void gl_log_msg (const char ∗ *format,* ...)

Logs a message to the log file.

Logs a message to the log file.

Parameters

format	Format string, in same format as `printf()`.
...	Variable arguments as specified by format string.

4.55.2.2 void gl_set_logging (const bool *status*)

Turns logging on or off.

Turns logging on or off.

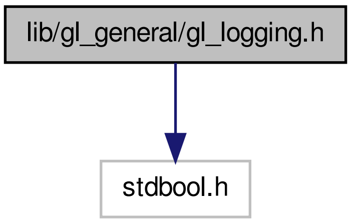
Parameters

status	`true` to turn logging on, `false` to turn logging off.

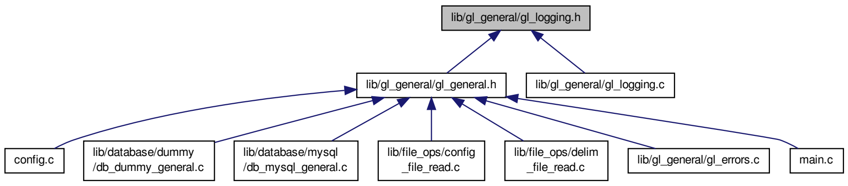
4.56 lib/gl_general/gl_logging.h File Reference

Interface to logging functionality.

`#include <stdbool.h>`
Include dependency graph for gl_logging.h:



This graph shows which files directly or indirectly include this file:


lib/gl_general/gl_logging.h
lib/gl_general/gl_general.h
lib/gl_general/gl_logging.c
config.c
lib/database/dummy /db_dummy_general.c
lib/database/mysql /db_mysql_general.c
lib/file_ops/config _file_read.c
lib/file_ops/delim _file_read.c
lib/gl_general/gl_errors.c
main.c

Functions

- void gl_set_logging (const bool status)

  Turns logging on or off.
- void gl_log_msg (const char ∗format,...)

  Logs a message to the log file.

4.56.1 Detailed Description

Interface to logging functionality. Interface to logging functionality. Enables debugging and other system messages to be recorded to a log file.

Author

Paul Griffiths

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4.56.2 Function Documentation

4.56.2.1 void gl_log_msg (const char * *format,* ...)

Logs a message to the log file.

Logs a message to the log file.

Parameters

format	Format string, in same format as `printf()`.
...	Variable arguments as specified by format string.

4.56.2.2 void gl_set_logging (const bool *status*)

Turns logging on or off.

Turns logging on or off.

Parameters

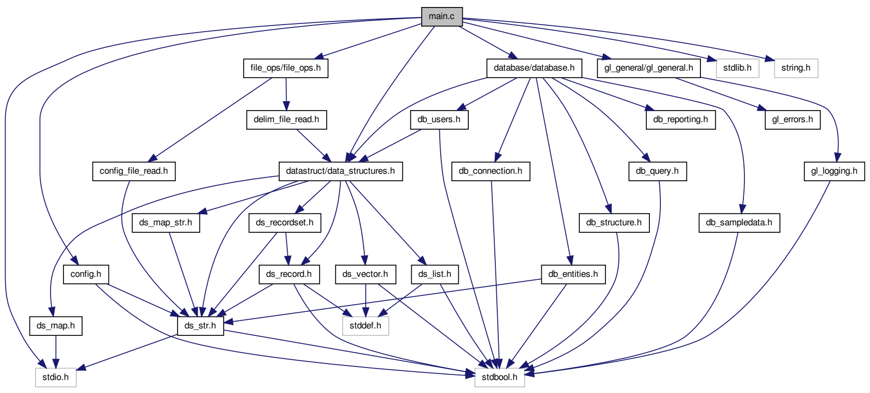
status	`true` to turn logging on, `false` to turn logging off.

4.57 main.c File Reference

Main function for general_ledger.

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "gl_general/gl_general.h"
#include "database/database.h"
#include "config.h"
#include "datastruct/data_structures.h"
#include "file_ops/file_ops.h"
```

Include dependency graph for main.c:



Functions

- ds_str login (void)

    Logs a user in and retrieves the password.
- void print_usage_message (char ∗progname)

    Prints a program usage message.
- void print_version_message (char ∗progname)

    Prints a program version message.
- void print_help_message (char ∗progname)

    Prints a program help message.
- void test_functionality (void)

    Casual test function.
- int main (int argc, char ∗∗argv)

    Main function.

4.57.1 Detailed Description

Main function for general_ledger. Main function for general_ledger.

Author

Paul Griffiths

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4.57.2 Function Documentation

4.57.2.1 ds_str login (void)

Logs a user in and retrieves the password.

Returns

The password.

4.57.2.2 int main (int *argc*, char ** *argv*)

Main function.

Main function.

Returns

Exit status.

4.57.2.3 void print_help_message (char * *progname*)

Prints a program help message.

Parameters

progname	The program name.

4.57.2.4 void print_usage_message (char * *progname*)

Prints a program usage message.

Parameters

progname	The program name.

4.57.2.5 void print_version_message (char * *progname*)

Prints a program version message.

Parameters

progname	The program name.

4.57.2.6 void test_functionality (void)

Casual test function.

Used for casually testing program functionality.

Index